TAMPERE UNIVERSITY OF TECHNOLOGY

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CUSTOMER PARTICIPATION IN BUSINESS MODEL INNOVATION

Master of Science Thesis

Prof. Miia Martinsuo has been appointed as the examiner at the Council Meeting of the Faculty of Business and Technology Management on November 8th, 2013.

ABSTRACT

TAMPERE UNIVERSITY OF TECHNOLOGY
Master's Degree Programme in Industrial Engineering and Management

LUKKAROINEN, SANNAMARI: Customer participation in business model innovation
Master of Science Thesis, 84 pages, 2 appendices (4 pages)
December 2013
Major: Industrial management
Examiner: Professor Miia Martinsuo
Keywords: Business model, innovation, customer participation, customer value

Several previous studies concern either business model innovation or customer participation but there is no research on customer participation in business model innovation. As a consequence, the objective of the thesis is to construct a framework for business model innovation through customer participation. The main research question is formulated as following: *How can a company utilise customer participation to improve its business models?*

The study began with a literature review of the topic. The research strategy was multi method multiple case study. One supplier company and three case companies, which were seen as customer companies, were involved in this research. Data was collected through observations, informal discussions and interviews. A semi-structured interview approach was used. Audio-recorder and transcripted interviews were coded, following the structures of the interviews.

As a result of the thesis, a framework is constructed to offer companies methods to involve customers into their business model innovation. The framework contains two parts. The first part consists of business model components, which are: customer value, market segment, revenue model and resources and capabilities. The second part consists of three participation methods, which are: design for the customer, design with the customer and design by the customer. The method called design for the customer was empirically tested and used to generate improvement ideas from the customers concerning customer value. This resulted in successful customer participation in business model innovation. Therefore, though the framework still needs verifying, it can be suggested that the other business model components and two other methods may also be suitable methods to integrate customers into business model innovation.

TIIVISTELMÄ

TAMPEREEN TEKNILLINEN YLIOPISTO
Tuotantotalouden koulutusohjelma

LUKKAROINEN, SANNAMARI: Asiakkaan osallistaminen liiketoimintamallin innovointiin
Diplomityö, 84 sivua, 2 liitettä (4 sivua)
Joulukuu 2013
Pääaine: Teollisuustalous
Tarkastaja: professori Miia Martinsuo
Avainsanat: Liiketoimintamalli, innovaatio, asiakkaan osallistaminen, asiakasarvo

Useat aikaisemmat tutkimukset käsittelevät joko liiketoimintamallin innovointia tai asiakkaan osallistamista toimittajan toimintaan. Tutkimusta asiakkaan osallistamisesta liiketoimintamallin innovointiin ei ole kuitenkaan tehty. Tästä johtuen työn tavoitteena on muodostaa viitekehys, joka yhdistää nämä kaksi asiaa. Työn päätutkimuskysymyksenä on: ”*Miten yritys voi hyödyntää asiakkaiden osallistamista oman liiketoimintamallinsa kehittämiseen?”*

Työ alkaa aikaisempien tutkimusten tiivistävällä kirjallisuuskatsauksella. Tutkimus on toteutettu käyttäen monimenetelmäistä monitapaustutkimusstrategiaa. Tutkimukseen osallistui yksi yritys toimittajan ja kolme yritystä asiakkaiden rooleissa. Data kerättiin havainnoinnin, vapaamuotoisten keskusteluiden ja haastatteluiden avulla. Haastattelut pidettiin puolistrukturoituina haastatteluina. Äänitetyt ja puhtaaksikirjoitetut haastattelut koodattiin haastattelurunkojen mukaisesti analyysia varten.

Työn tuloksena muodostettiin viitekehys, joka tarjoaa yrityksille menetelmän ottaa asiakkaat mukaan liiketoimintamallinsa innovointiin. Viitekehys sisältää kaksi osaa. Ensimmäinen osa koostuu liiketoimintamallin komponenteista, joita ovat asiakasarvo, markkinasegmentti, ansaintalogiikka sekä resurssit ja kyvykkyydet. Toinen osa muodostuu osallistamismenetelmistä, joita ovat suunnittelu asiakkaalle, suunnittelu asiakkaan kanssa ja asiakkaan tekemä suunnittelu. Suunnittelua asiakkaalle osallistamismenetelmää testattiin keräämällä asiakkailta parannusehdotuksia liittyen asiakasarvoon, joka on yksi neljästä liiketoimintamallin komponentista. Menetelmä mahdollisti asiakkaan osallistamisen liiketoimintamallin kehittämiseen. Kaksi muuta menetelmää ja muut liiketoimintamallin komponentit saattavat soveltua asiakkaan osallistamiseen liiketoimintamallin innovointiin. Viitekehys tarvitsee lisää tutkimusta.

PREFACE

A few years ago, graduation was just a distant dream. Now, this dream is coming true. My Master's thesis is completed and my excitement is almost tangible. There are several people who really deserve special thanks for their efforts.

This study would never have started, taken place or ended without invaluable help and support from several people. First, I would like to thank my advisor Miia Martinsuo for her inspiring guidance and feedback through the process. Secondly, I want to thank Tuomas, who organised the access to the companies, and everyone who participated in the interviews and observations. I also owe thanks to my colleagues at the Department of Industrial Management. Without you, writing this thesis would have been much harder.

Finally, I would like to thank my family and especially my friends. I would never have gotten through my studies without the help and support of my friends. We had such a good time. However, I am sure we are going to have even greater time after we have all finished our studies. I also want to thank Emilie and Mario for proof-reading my thesis. I really appreciate your effort. There is still one person who needs great recognition, Ville. Thank you for supporting me through my studies. Now our common journey can finally begin.

Tampere, December 31st, 2013

Sannamari Lukkaroinen

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1. INTRODUCTION

The importance of an innovative business model increases continuously and innovative business models are getting greater significance among both the researchers and managers. Furthermore, customer participation is broadly used as source of the competitive edge. This thesis combines these aspects and concentrates on understanding how customer participation can be used when developing, innovating and adding services to a business model.

1.1. Background and motivation

Due to globalisation, competition continuously increases among companies and especially among industrial companies. New players appear particularly from emerging and developing countries. In addition to cheaper production costs in developing countries, the level of knowledge rises, which causes new challenges for the firms of industrialised countries. The competitive edge of industrialised countries can no longer be based on an expertise in technology only, because developing countries already compete for market share with sophisticated technology. In order to differentiate from competitors, business should be somehow unique. This can be achieved by exploiting a business model concept. Thus, the cutting edge lies in an extraordinary business model, which either explicitly or implicitly addresses the internal competencies of the firm (Morris et al. 2005).

Business models have a long history as they have existed as long as there has been business. However, the popularity of business models is a rather new phenomenon (Osterwalder et al. 2005). In 1957, the term was mentioned in a scientific paper of Bellman et al. for the first time (1957). Already in 1960, the term was in a title of a scientific paper of Jones (1960). However, little research was related to the topic back then. The dotcom-boom changed this situation because it inflicted prolific research of the topic and the term business model began to emerge widely as a buzzword in the late 1990s (Magretta 2002). To conclude, the research into the business model concept has dramatically increased during the past few decades (Burkhart et al. 2011). The main reasons for this was a shift from traditional to internet-based business activities and analysis of successful and unsuccessful internet companies. At the moment, the research is not focused only on e-business, but it is applied to all kinds of industries and businesses. (Burkhart et al. 2011.)

A review of Zott et al. (2010) found that the term business model has been used mainly in order to describe and explain three phenomena: 1) e-business; 2) strategic issues and 3) innovation and technology management. Within the e-business literature, the interest has been on understanding ways of doing business on the internet and on roles in new ecosystems. Therefore, scholars have defined and represented business models of e-commerce and developed taxonomies and typologies. Scarce empirical testing and causal explanation of e-business is conducted. Research concerning strategy revolves principally around a value creation network, the relationship between business models and firm performance and the separation between business model and any other strategy component. Innovation and technology related research sees a business model mainly as a mechanism which connects new technology of the firm with customer needs and other resources of the firm. This study concurs with the last point of view. Therefore, a business model links new technology with resources of the companies, such as customers.

The findings of Morris et al. (2005) are similar to the review of Zott et al. (2010). Morris et al. (2005) revealed that the research of business models focuses on the construction of a business model, typical model types, and both failed and successful models. Recently, studies have begun to concentrate more on business model innovation or on more broadly altering and improving business models (Laaksolahti 2012).

Several studies have proved that a business model innovation can create competitive success for companies (Baden-Fuller & Morgan 2010; Björkdahl 2009; Chesbrough & Rosenbloom 2002; Chesbrough 2007; McGrath 2010; Mitchell & Coles 2003b; Kalakota et al. 1999; Teece 2010). For example, a successful business model can beat a better idea or a technology innovation of a competitor (Chesbrough 2007). Innovative business models have also reshaped entire industries and redistributed billions of dollars of value (Johnson et al. 2008). Thus, well designed business models can positively affect the performance outcome of the company (Zott & Amit 2008).

Recently a business model innovation has become an important tool to recognise new opportunities for value creation for both the customer and the company themselves (Kujala et al. 2010; Zott et al. 2011). Despite the understood importance of business model innovation, hardly any studies have managed to explain clearly how to innovate a business model.

Furthermore, there is a shortage of research in the area of exploiting customers when innovating business models. Customer participation is proposed to bring benefits such as a decreased cycle time of products and improved services (Alam 2002). Customer utilisation is also beneficial because customers have the best practical knowledge of the business model operation. Customers know what they need at the moment and they have even solutions for satisfying their needs (Lilien et al. 2002). Thus, customers know

both the positive aspects of the business model and those aspects that need reforming. Customers also determine the value-in-use of the offering (Kowalkowski 2008), which is also essential information for the supplier. To conclude, customers may have valuable proposals for improvements on the business model of the supplier. However, there are no studies which utilise customer participation when improving the business model. Thus, exploiting customer participation on business model innovation and renewal should be studied. Furthermore, methods for customer involvement into business model innovation should be revealed.

In addition to concentrating on a business model concept, competitive advantage can also be sought by adding services to the product portfolio. Previously, services such as installation and commissioning were often given for free in order to foster sales (Oliva & Kallenberg 2003). The increase of services that were billed began from adding after-sales services, but nowadays services such as training and consulting are becoming more popular (Turunen & Toivonen 2011). To succeed in competition and to respond to new customer demand, companies should learn to increase, value, sell, distribute and invoice their services (Oliva & Kallenberg 2003). This is extremely challenging because the whole mind-set of services must be altered (Neely 2008).

The transformation towards a service oriented business is challenging and many changes in companies must be made. Providing services requires, for example, new capabilities (Oliva & Kallenberg 2003), organisational rearrangements (Gebauer et al. 2005) and adopting a totally new business model (Kindström 2010). Business models must be altered from product based business models towards service based business models in order to succeed in the adjustment of operations (Kindström 2010). Business models are important for the companies' success because the choices in the model affect companies' possibilities for value creation and capture (Amit & Zott 2001). Moreover, transferring the focus of the business model from products to services offers an extension to the market scope of the company (Kindström 2010). Despite a large number of studies concerning business models, there is a shortage of research in the area of creating a new business model when transferring towards service based business model (Wallin et al. 2013).

1.2. Research questions and objectives

The case company of the thesis is an industrial company which operates in international markets. The company has developed totally new automation technology on its devices and the business model needs to be renewed in order to increase sales and profitability. Other interests of the case company are to understand how customer value of new technology is realised and to add services to the business model.

The research concentrates on understanding how customer participation can be used when developing, innovating and adding services to a business model. This means that ideas of customers will be surveyed when improving the business model of the supplier. Therefore, the main research question to be answered is:

> *How can a company utilise customer participation to improve its business models?*

The research question breaks down in to the following questions:

> *What kind of value do new features in the offering deliver to the customers and how do they deliver that?*
> *How can a company increase the customer usage of purchased product features?*
> *How can a company add services to the business model with the help of customer participation?*

The thesis has two purposes. The first purpose is from a theoretical aspect and the other one is from a point of view of the company. The theoretical aim is to increase an understanding of the use of customer participation in the business model innovation process; and the goal of the company is to clarify the value of the automation features for its customers and to increase usage of the new functions in acquired devices. Thus, there are two perspectives on the thesis. The first one is a scientific contribution and the second one is the interest of the case company managers.

1.3. Research context

This thesis is a part of the FIMECCs (Finnish Metals and Engineering Competence Cluster) FutIS (Future Industrial Services) research program, which aims to promote the adoption and expansion of service business in technology-based industrial firms. To be precise, this thesis is also a part of the SBC (Service Business Capabilities) project, which is one of the research projects of the FutIS program. The SBC project aims to promote service business capabilities of technology-based companies.

Even though the thesis is a part of the SBC project, which belongs to the FutIS program, the thesis has one more influencer in addition to the project and program. One of the main influencers is the case company, whose problems the thesis tries to solve. Furthermore, the department of Industrial Management has a slight impact on the thesis.

1.4. Case company and methods

A Finnish industrial company, who is one of the cooperation firms of SBC project, has created a system which collects data from the devices at a site of the customer. Through the gathered data, services can be allocated at the right moment on the devices. The firm

has also developed new innovative automation functions on its devices. The company believes that using both the remote data gathering system and the automation technology will create an extraordinary value for the customer due to more efficient usage of the device, targeted maintenance and other services.

Unfortunately, the company have issues with the automation functions – not many of its customers use these functions regularly. Thus, the value proposition of the device and its functions do not realise. Moreover, the service opportunities connected to the automation functions and data gathering system have not been achieved.

The company wants to find out what kind of value the automation functions create for its customers in practice and how to increase the usage of the new features among the customers in order to be able to utilise the remote data system. To get insight in the delivered value of features and to get some ideas to add usage of the features, data and information is collected from three selected customer companies of the company in question. To conclude, there are one supplier company and three customer companies in this study. The customer companies are all active in different business area which makes the research data quite broad and reliable. The data will be gathered by observing the use of the devices both without and with the new features and by interviewing the users of the devices as well as people who were involved in a sourcing of the automation device.

In addition being oblivious to the reality of the customer value of the new functions, the company is not sure of how those features should be sold to their customers. At the moment the company faces the need to renew their business model in order to sell more devices with the new features and capture their value. Without a well-designed business model, the company will fail to either deliver or to capture the value of the new innovative automation functions. In order to solve this problem, a business model concept will be surveyed.

The research will be an exploratory study. To achieve the aim of the thesis, a multiple case study, which is suitable for exploratory research, will be conducted. Saunders et al. (2009, p. 140) propose three principles to conduct an exploratory research: “a search of the literature; interviewing ‘experts’ in the subject; conducting focus group interviews.” Two of those strategies, searching the literature and interviewing experts, are used to answer the research questions of this thesis. It was impossible to organise focus group interviews due to the nature of the working environments in the customer companies. In addition, observation will be used to understand the current situation of the companies and to design a suitable questionnaire for interviews. To conclude, the research is conducted by using multiple methodologies and multiple case studies to increase its validity.

1.5. Structure of the thesis

The thesis is divided into six chapters. The chapter after the introduction is a literature review which consist of business model, business model innovation, customer and customer participation in business model innovation. The literature is reviewed in order to get a comprehensive understanding of the topic and to build a theoretical foundation for the empirical section. The last part of this literature review presents a composed framework of previous studies. The framework will be tested later on in the thesis.

The third chapter consists of the research method. In this chapter, the research strategy of the thesis is emphasised and companies under the survey are introduced. After that, the methods for data collection are presented in more detail. The last part explains how the gathered data is going to be analysed.

After the research methods, the results are listed. Each company is presented separately. After the separate results case by case, the cross case analysis is presented. The next chapter examines how the results of this thesis are linked to prior studies. This chapter also considers the benefits and challenges of the proposed framework as well as the benefits and challenges of customer participation in business model innovation in general. In other words, the fifth chapter contains the discussion of results. .

The last chapter of the thesis is naturally a conclusion. The conclusion consists of several parts. First, the academic and managerial contributions are considered. The extent to which the objectives are met is reviewed next, followed by an evaluation of the limitations of the thesis. The last part offers several research ideas for the future.

2. LITERATURE REVIEW

This section presents the literature, on which the thesis bases. The first part of the literature review focuses on defining the term business model though the task is not easy. The definition reveals that the business models consist of components. The business model components of this thesis are customer value, market segment, revenue model and resources and capabilities. Next, business model innovation is defined as a term and some innovation ways are given as examples. The rest of this section concentrates on the customer due to the significant role of the customers in this thesis. Customer value is considered as important to cover. The second aspect is placing customers as a part of the resources of a company. The third topic is customer participation and it functions as an introduction to the last section which combines the customer participation in business model innovation. A framework is constructed and introduced in the end of this chapter. The framework bases on the presented literature and the framework will be tested later on.

2.1. Business model

This subtitle contains three parts. The first part is defining the term ‘business model’. The second part presents all the components of previous studies and distils the business model elements suitable for the purposes of the thesis. The third part depicts two dissimilar types of the business models.

2.1.1. Definition of business model

Business model is, as a term, often associated with numerous managerial concepts. For example, a business model includes the key elements of a business plan. The business plan contains a number of operational issues which the business model does not contain. Furthermore, the business models are sometimes linked to an activity set, even though it is not a set of activities. This means that business models often support a certain activity set, but the elements of the model are not activities. Likewise, the business model is often related to strategy but it is not a strategy although it includes several strategic elements. (Morris et al. 2005.) Both the strategy and the business model affect the market value of the company even though they are truly distinct constructs. This often causes confusion (Zott & Amit 2008). Westerlund (2009) explains the linkage between the business model, strategy and activities as following: the business model is positioned between strategy and processes.

Earlier, it was mentioned what a business model is not. This section will describe what a business model is in detail. In spite of several years of business model research and the importance of the concept, no generally accepted definition of the term has emerged (Weill et al. 2011). This may partly be so because of the interest in the concept from numerous different disciplines (Shafer et al. 2005). There are almost as many presented definitions of business models as there are research groups in the field. This has led to confusion in terminology; business model, business concept, economic model, revenue model, and strategy are sometimes used interchangeably (Morris et al. 2005).

Despite the numerous definitions, only the most remarkable ones are studied. According to Burkhart et al. (2011) one of the most referred to definitions is by Timmers (1998, p. 2) who specified business model to be "an architecture for the product, service and information flows, including a description of the various business actors and their roles; and a description of the potential benefits for the various business actors; and a description of the sources of revenues." Timmers' definition seems to be rooted in the e-business and it is based on the idea of a networked organization. That is why, in his definition, Timmers emphasises a product, service, and information flow in order to provide value for business actors. Similar to Timmers, who emphasises an information flow, Teece (2010, p. 173) determines data as one component of business model; "A business model articulates the logic and provides data and other evidence that demonstrates how a business creates and delivers value to customers."

In contrast to concentrating on information and data affected by e-commerce, the main focus of definitions is value creation. For example, Casadesus-Masanell & Ricart (2010, p. 195) define business model as "logic of the firm' – how it operates and creates value for its stakeholders". Shafer (2005, p. 202) shares the idea of value creation and defines business models as following: a business model is the "representation of a firm's underlying core logic and strategic choices for creating and capturing value within a value network." Johnson (2008, p. 60) describes business models similarly – a business model "consists of four interlocking elements that, taken together, create and deliver value."

Chesbrough & Rosenbloom (2002, p. 529,532) see business models from a more technical perspective and they have developed a fairly technical-oriented definition – "heuristic logic that connects technical potential with the realization of economic value." According to them, a business model is a coherent framework which "takes technological characteristics and potentials as inputs and converts them through customers and markets into economic outputs". In spite of the technological point of view, value creation has an important role in this model. Chesbrough & Rosenbloom (2002) consider a business model to be an appliance that mediates between value creation and new technology.

Some of the definitions are very narrow and some include everything that can be connected to business models. An example of such a wide definition is by widely cited Magretta (2002, p. 4) who describes business models simply as “stories that explain how enterprises work”. Quite similar to that definition is by Clark et al. (2012, p. 21), who defined the business model to be: "the logic by which an enterprise sustains itself financially.” In contrast to such abstract definitions, a more concrete definition is developed by Osterwalder et al. (2005). They have defined the business model as a conceptual tool, which has a set of components and which determines the relationships of those elements. The business model expresses the logic of the specific business as well. Burkhart et al. (2011) analyses previous definitions to be wide enough to cover every kind of business model, yet it is concrete enough to be meaningful. Hence, the business model definition of Osterwalder et al. (2005) will be applied in this thesis. It successfully describes the idea that the business model is composed of components and the idea that it contains the logic of the company.

2.1.2. Components of business model

The component-based perspective has dominated business model research for the last years (Burkhart et al. 2011). Business model components represent the key aspects of the business of the company (Westerlund 2009). Similarly to the definition of the business model, recent studies represent several classifications for the components; therefore, no unanimously accepted agreement on the elements has been formed. (Morris et al. 2005) Moreover, a lack of unified terminology has occurred and synonyms for the term business model component have been used; the examples of the employed terms are business model dimension, element and building block (Laaksolahti 2012).

The number of components presented in the business model varies depending on the researcher. Shafer et al. (2005) presents 42 different business model elements in 12 business model definitions in a review of business models. Thus, an average business model definition had three and a half components. Whereas the study by Morris et al. (2005) revealed that the quantity of key elements varies from four to eight. They found 24 different components such as revenue sources, value offering, and products. Morris et al. stated that the most cited components were value offering, economic model, customer relationship/interface, partner network, internal infrastructure and target markets. Burkhart et al. (2011) reshaped those components and they categorised the components into groups of elements such as offering factors, market factors, internal capabilities factors, competitive strategy factors, economic factors, and personal or investigator factors. Whereas Shafer et al. (2005) classified the 42 found components into only four groups: strategic choices, value network, creating value, and capturing value.

Some researchers have included quite numerous elements in the business model concept. Hedman & Kalling (2003) proposes that the business model composes of six components which are an offering, customers, competitors, activities and organisation, resources, and supply of production inputs. Chesbrough (2007) also suggests six elements but they slightly differ from the previous ones. Suggested components are value proposition, structure of the value chain, revenue generation mechanism, position of the company within the value network, market segment, and strategy. Osterwalder & Pigneur (2010) believes that business model should be described with nine elements, which can be combined into four groups: an offer, customers, infrastructure, and financial viability. Those nine building blocks are a value proposition, customer segment, customer relationship, channels, revenue streams, key resources, key activities, key partnerships, and cost structure.

In conclusion, many suggestions for business model components have been given. Two components appeared in almost every definition in one or another form – customer value and revenue model. Tsvetkova & Gustafsson (2012, p. 249) describe the revenue model broadly as the mode by which a company creates money "from delivering value to a customer by utilising its capabilities". The other component – customer value – will be described later.

A customer segment or market segment is very often considered an essential element of the concept as referred earlier. In addition to customer value, revenue model and market segment, Tsvetkova & Gustafsson (2012) amongst others present capabilities to be an important element of the business model. Then again, Hedman & Kalling (2003) and Osterwalder & Pigneur (2010) replace capabilities with resources. However, they are not substitutive to each other and for the purposes of this thesis they are combined because they are clearly related. Thus, business model components in this thesis are customer value, market segment, revenue model and resources and capabilities. Figure 1 demonstrates the selected components.

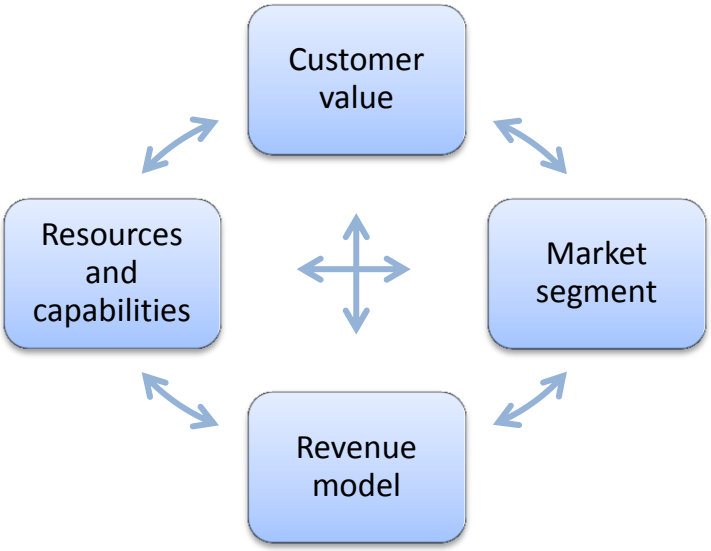

Figure 1. *Business model components (adapted from Tsvetkova & Gustafsson 2012)*

Zott et al. (2010) state that it is vital to remember that no component can form a business model alone because the business model is composed of all its elements. Wallin & Palo (2011) agree. They also clarify that the business model components are interrelated and elements must be viewed holistically especially when developing business. Due to the interrelation of the components, that was stated by Kindström (2010), when changes occur in one component, adjustments are required in the other components as well in order to maintain a stable business model. To conclude, when changes occur even in a single component, the whole business model needs revision as well. That is why Figure 1 has double-ended arrows.

2.1.3. Business model types

Business models can be categorised based on the mix of tangible and intangible components (Baines et al. 2007). Kley at al. (2011) defined two main classifications which are a product oriented business model and a service oriented business model. At this point it is necessary to define a product and service in order to avoid confusion later on. A definition of a product is generally accepted and it is represented as a material artefact such as a car, table or apple. Defining a service is more disputative. However, definitions often refer to that what it is not a product. In a world of manufacturing, examples of services are repair, maintenance and insurance. Thus, the word refers to service offering. (Baines et al. 2009.) For the purpose of this thesis, a definition of service is connected with the service offering and is defined as "An economic good consisting of human worth in the form of labour, advice, managerial skill, etc., rather than a commodity" (Law 2010, p. 378).

As aforementioned business model types can be classified either as a product oriented business model or as a service oriented business model. Figure 2 demonstrates the classification of the business model concept. The business models that are currently in use are located all over the product-service continuum (Tukker 2004). The product oriented business models are on the left side of the continuum and they are commonly used. However, new business models frequently utilise services abundantly when creating value for the customer and thus they are located on the right side of the continuum (Matzen et al. 2005).

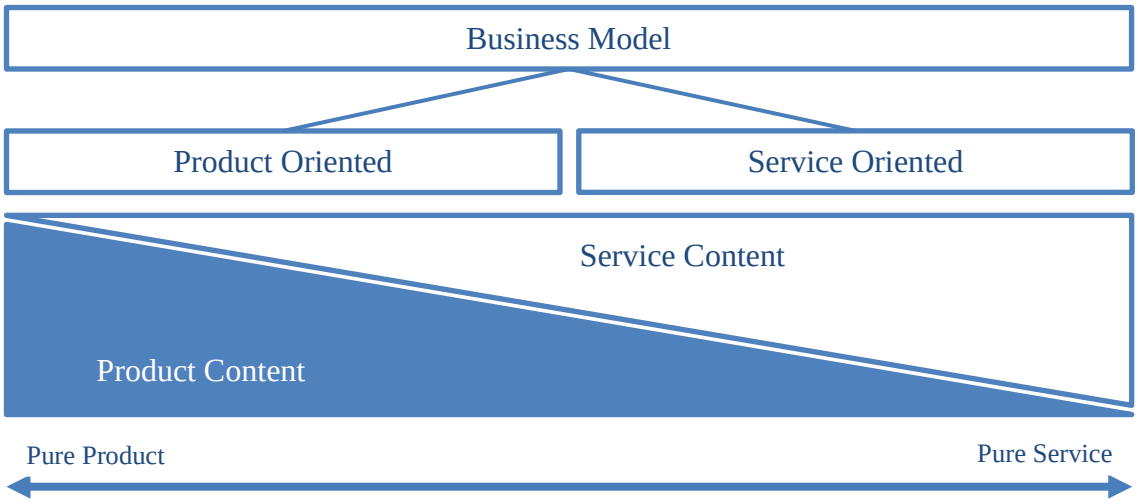

Figure 2. *Business model typology (adapted from Kley at al. 2011)*

A product oriented business model is a classical business model where customer value is derived mainly or even completely from products. However, services can be added in order to support the core products, increase product sale and strengthen customer loyalty. In contrast to a classical product oriented business model, the service oriented business models are seen as an innovative type of business model due to their novelty and narrow distribution. The focus is no longer the product itself but rather performance and services. (Kley et al. 2011.)

2.2. Business model innovation

By business model innovation, Mitchell & Coles (2003a, p. 18) mean "any successful change in any elements that enhances a on-going performance in delivering benefits". A year later, Mitchell & Coles (2004) deepen their definition in another paper. Business model innovation means business model renewal that brings about new services or products to the new customers or new markets. Previous definitions are clear but quite narrow. Frankenberger et al. (2013) successfully broaden the definition by concluding the definitions of several authors (Amit & Zott 2001; Chesbrough 2010; Demil & Lecocq 2010; Mitchell & Coles 2003b; Teece 2010). Frankenberger et al. (2013, p. 253) define business model innovation as "a novel way of how to create and capture value,

which is achieved through a change of one or multiple components in the business model". This matches perfectly with the purposes of this thesis and is thus, the applied definition.

An offering can be called innovative when it has some kind of novelty value. Garcia & Calantone (2002) categorise novelty values into three categories. Those categories are newness to the customer, newness to the industry and newness to the firm. See Figure 3. Thus, a product or service can be described as innovative when it has any of the previously mentioned aspects of newness. This categorisation can be applied for business model innovations as well.

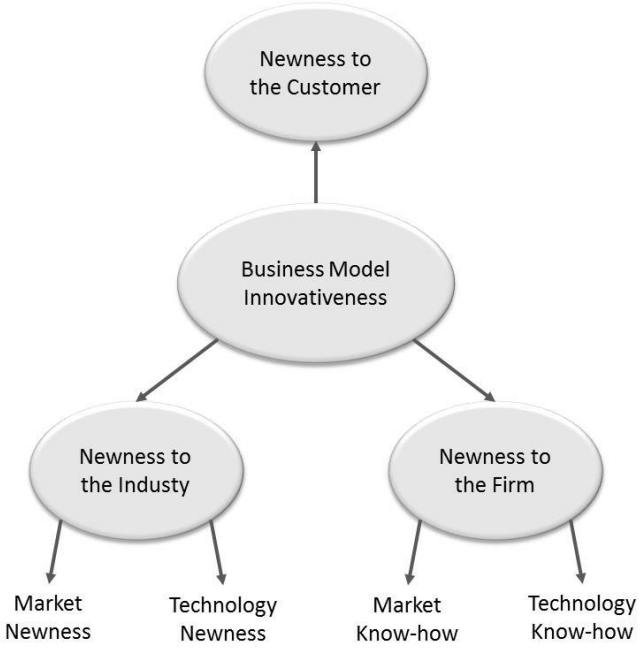

Figure 3. *Operationalisation of business model innovativeness* (Garcia & Calantone 2002, p. 124)

Business model innovation should be an iterative process and thus, it can generate both small improvements on a business model and totally new innovations (Garcia & Calantone 2002). Innovations are often divided into two categories, which are a radical innovation and an incremental innovation (Dismukes 2005). This categorisation is typically used for technological innovations and the innovations are often conceptualised as an S-curve which represents for example an increasing efficiency or performance over time (Asthana 1995; Chandy & Tellis 1998). The incremental innovation is every movement in time on the S-curve and the radical innovation occurs when jumping from one S-curve to another (Roy et al. 2004).

Chesbrough (2010) successfully compares the importance of business model innovation with the importance of new technology innovation. He claims that firms need the ability to develop both innovative technologies and business models. He argues that the new

technology has no value by itself. The economic value of the technology appears only with a suitable business model. Sometimes the appropriate business model is unclear but discovering the suitable model is essential in order to capture value from the new technology. Unless a fitting model can be found, the technology generates less profit than it would with the appropriate business model. Moreover, if a competitor sells the same technology but uses a better business model, the competitor yields more profit than the company with the weaker business model. Hence, Chesbrough claims that companies can gain at least as much value from developing a new business model as from a new technology. In concludsion, companies must develop both the innovative technologies and the innovative business models.

Business model innovation is typically considered as a management practice (Mitchell & Coles 2003a). It is important to develop a new business model before the old model becomes obsolete. The retirement of the business model is inevitable because “no great business model lasts forever”. (Chesbrough 2007, p. 15.) Thus, the continuous business model innovation can be considered as a crucial task for the companies (Chesbrough 2010). In some markets it is reasonable to have simultaneously some business models due to differing customer preferences. Moreover, this enables both business model testing on some customers and gradually changing the main business model. Trying out the new business model on the real markets is proven to have the highest reliablility. (Chesbrough 2007.) Therefore, involving customers in business model testing appears to be reasonable.

Sjöholm & SWOT Consulting (2010, p. 166) acknowledge four ways for business model innovation. Those methods are:

1. Combine an improved offering and a new business model.
2. Sell the present offering with a new business model for a new customer group.
3. Offer a totally new product/service innovation combined with a new business model.
4. Create new operative innovations and processes innovations and thus, renew the total business model.

According to Sjöholm & SWOT Consulting (2010, p. 166) each of the methods introduces an innovative business model. They have a similar point of view as Garcia & Calantone (2002) because market newness and offering newness are considered. See Figure 3.

2.3. Customer

In this chapter, the focus is first on a theory that discusses the customer before continuing with customer participation in business model development. The

terminology around the topic is somewhat confusing. Term customer is used in this thesis because it is more common in the literature than the term user or end user. Important topics that are related to the customer are understanding customer value, customers as a resource and customer participation. These topics are discussed in details in separate sections.

2.3.1. Understanding customer value

During the last decades, scholars have identified different aspects of customer value in business markets both through empirical and conceptual research (Lindgreen & Wynstra 2005; Möller & Törrönen 2003; Ulaga & Eggert 2006). A newer aspect of this research is the co-creation of value and the emphasising of an active role of customers (Terho et al. 2012). Value co-creation is mostly studied by focusing on services. In those service related studies, value is co-created by both a seller and a customer (Grönroos 2008; Vargo & Lusch 2004).

There is a similar situation as with the term business model when trying to find a single definition for the customer value. Several definitions for customer value can be found. Kotler and Keller (2006) are greatly cited authors when it comes to customer value. They define customer value from the aspect of a buying customer which is a suitable perspective for this thesis as well. The authors describe value as a difference between benefits of a product or a service and sacrifices that are caused by buying the product or the service. Hence, the customer perceives the value when the benefits that the supplier provides are greater than the sacrifices made by the consumer. This idea is similar from a perspective of the supplier because the supplier also sacrifices its resources and receives benefits when selling the products and the services. A study by Lapierre (2000, p. 133) for instance supports the widely applied theory of benefits and sacrifices: "benefits, i.e. what customer gets, and sacrifices, i.e. what the customer gives".

When understanding the value from both perspectives – customer and supplier – it is easier to understand the contents of the aforementioned components of the business model. Two of the four selected business model components are connected directly to value. These two elements are customer value and revenue model. The customer value is the value perceived by the customers as explained in the previous paragraph. However, the connection between the value and the revenue model is not that straightforward. There are several points of view in the revenue model and the value perceived by the supplier is one of those aspects.

Customer value is one of the components of the business model. An aim of the business model concept is to create the value for the customers as told earlier (Chesbrough & Rosenbloom 2002; Morris et al. 2005). However, hardly any focus of the business model research is on understanding and creating the customer value. Studies of the

customer needs and customer values are very important because the customer is willing to pay only for the product or the service that provides them value (Kotler & Keller 2006). Furthermore, customer value is always experienced individually. Therefore, the same offering generates a different value for different customers or for differing markets and therefore, several business models can be active at the same time, even when using only one single offering (Markides & Charitou 2004; Wikström et al. 2010).

2.3.2. Customer as a resource

Tucker (2001) praises the importance of understanding customer needs when developing a new product or a new service. According to him, customers are prone to indicate when a supplier should conduct changes. Furthermore, customers are those who give feedback and, in the ideal situation, the feedback cause changes in the company in order to satisfy the customers. Despite this dynamic being triggered by the customers, the customers are not seen as a resource of ideas for new business models in broader research. An exception to this is a study by Plé et al. (2010) who consider the customers as one of the resources among other resources of a business model. Whereas, for instance in the study by Gouthier & Schmid (2003), the customer can be considered as a resource of the company but the aspect of the business models is not included. In their study, they notice that the customers are said to be an important resource in publications on marketing and service management because typically customers participate in service production. As such, the customers are seen as the resource but not related to the business models.

Several researchers highlight that a competitive edge is based on resources of the company (e.g. Barney 1986; Peteraf 1993; Prahalad & Hamel 1990; Reinartz & Ulaga 2008; Wernerfelt 1984). The resource-based view focuses on resources from inside the firm, while the industrial-organisation view concentrates on the resources that come from outside the firm. Customers as a resource can be classified under both internal and external resources because they are partly integrated in the company though they operate outside the supplier company. (Gouthier & Schmid 2003.) Moreover, combining the internal and the external viewpoint is important (Hooley et al. 2001). Before continuing with the topic, company resources need a definition as a term. The definition that is used in this thesis is by Amit & Schoemaker (1993, p. 35) “The firm’s resources will be defined as stocks of available factors that are owned or controlled by the firm”. Availability of the resources is not enough. Wernerfelt (1984) remarks that resources must be tied to the company either permanently or at least semi-constantly. Thus, only those resources that are available for the firm can create competitive advantage.

In a study by Plé et al. (2010), customers are seen as the resource of the company and they integrate customers into the business model of the supplier. The result of the study

is a theoretical framework, which enables firms to integrate their customer into the business model. They call this model "Customer-Integrated Business Model (CIBM)". See Figure 4.

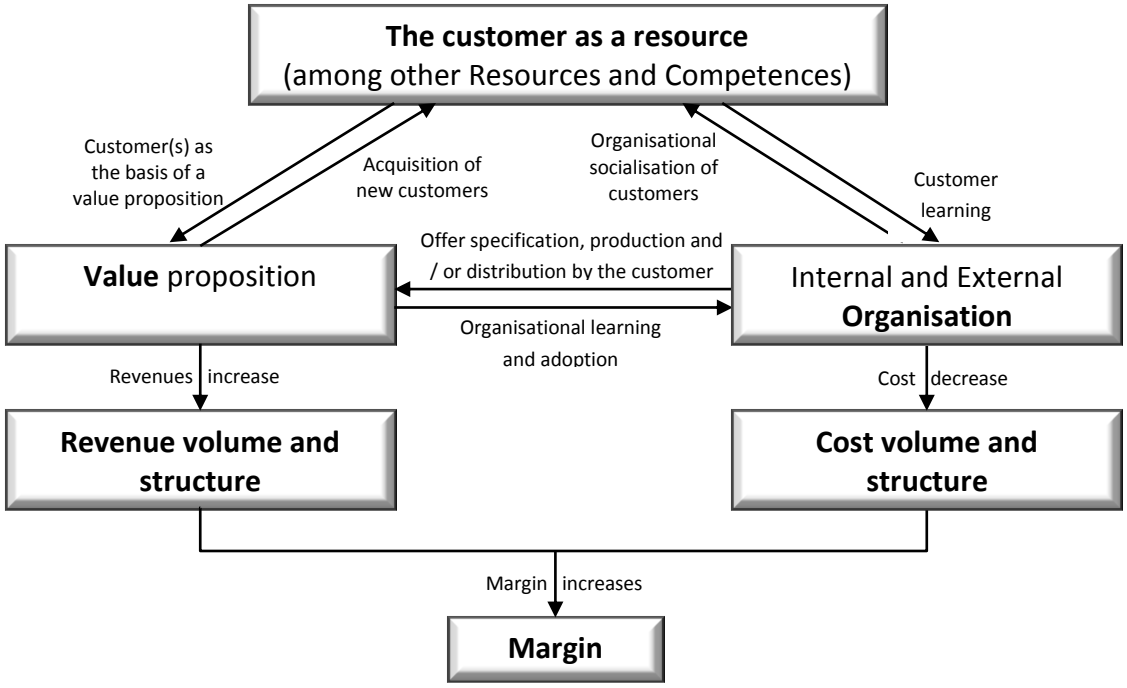

Figure 4. *Full customer-integrated business model* (adapted from Plé et al. 2010, p. 246)

Plé et al. (2010, p. 257) justify their framework by arguing that the customer integrated business model "appears to be necessary, for both theoretical and empirical reasons". They continue by saying that many companies have taken their customers into co-production of a value proposition. However, the majority of the customer participation studies concentrate on management and service marketing literature according to them.

Wernerfelt (1984) notices that every company has particular resources which distinguish the company from any other company. However, not all resources and their combinations can generate a competitive edge. Competitive advantage is possible to achieve only if resources and combinations of the resources are valuable, rare, imperfectly imitable and substitutable (Barney 1991, pp. 105–112).

Firstly, resources and capabilities of a company "are valuable if, and only if, they reduce a firm's costs or increase its revenues compared to what would have been the case if this firm did not possess those resources" (Barney 1996, p. 147). Furthermore, in order to be valuable, a certain resource must improve effectiveness or efficiency and it must be either indirectly or directly perceived by the customer. Secondly, for potential or current competitors, a rare resource is unattainable or a difficult to access. Thirdly, an imperfectly imitable resource is difficult to imitate for the competitors. Fourthly,

imperfectly substitutable resources are difficult to replace with any other resource. In other words, no other resource or resource combination can create a similar or identical competitive edge than the original resource creates (Gouthier & Schmid 2003, p. 121).

The customer as a resource can create a competitive advantage when considering each issue of previously presented list by Barney (1991, pp. 105–112). Firstly, the customer can be valuable and thus, useful for the company. Customers can e.g. produce new business ideas and generate suggestions about how to improve old procedures or at the very least, customers can tell what should be improved or altered (Lilien et al. 2002). Secondly, the customer as a resource can be seen as a rare resource because customers have no time to act as a resource for every supplier. Moreover, the company must have a good relationship with the customer in order to have access to the customer as a resource. Fourthly, customers as a resource are difficult to copy because no other resource observes the situation as customers do. Hence, customers qualify the criterion by Barney (1991, pp. 105–112) of the resource that achieves competitive advantage.

2.3.3. Customer participation

Conventionally customer participation in an exchange process is considered to be mainly passive before the time of negotiations. However, the role of the customers is changing and customers are seen more as active participants during the whole exchange procedure. (Wind & Rangaswamy 2001, pp. 20–21.) Moreover, several companies have been inspired by open innovation and open-source communities (e.g. Lee et al. 2012; von Hippel & von Krogh 2003) and thus, the companies offer new, important roles to their customers in the processes of the company (Plé et al. 2010).

Furthermore, there is a change in a total philosophy of "What can we do for you?" to "What can you do with us?" (Wind & Rangaswamy 2001, pp. 20–21). Ngo & O'Cass (2013, p. 1136) rephrase this idea and according to them the right question for the customer participation is "what firms can do with customers" in order to co-create value. Therefore, customers are no longer seen only as purchaser of an offering or an addressee of the value proposition (Djelassi & Decoopman 2013). They have new roles for example as a partner or value co-creator (Vargo & Lusch 2004) and "The goal is not to create value for customers but to mobilise customers to create their own value from the company's various offerings" (Normann & Ramirez 1993, p. 69). The change of the customer role is concluded in the Figure 5.

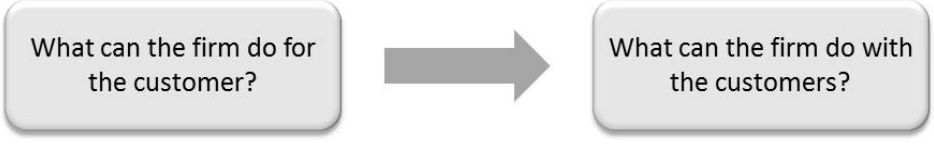

Figure 5. *Change of the attitude towards customers*

There are several definitions and terms for customer participation. Some of the terms in use are identical and some are slightly different. Customer involvement is defined as an interaction between customers and the design process (Alam 2002). Participatory design is described to be quite similar. The customer is involved as a team member in development projects (Muller et al. 1993). Involving co-developers is useful after the design phase. Co-developers evaluate for example the new technology of the supplier (Anderson & Crocca 1993) and the customer becomes involved into the development or a joint project (Neale & Corkindale 1998). Lead users are customers who present their current needs strongly and those needs tend to become common needs in the markets in the future (von Hippel 1986). The term customer participation merges previously explained terms. Customer participation is defined as direct, overall participation of customers or customer users (Martin et al. 1999). To conclude, the degree of cooperation with the customers varies in each definition and the level of the interaction is the biggest in the customer participation. Table 1 presents these customer roles and definitions.

Table 1. *Studies on customer involvement in new product and service development (adapted from Matthing et al. 2004, pp. 483–486)*

Authors	Primary focus	Definition of customer involvement and summary of comments and findings
Alam (2002)	Objectives, stages, intensity and modes of user involvement	User involvement is intense at initial stages of idea generation and screening and the later stages of test marketing and commercialization. Six objectives were reported, including rapid diffusion and decreased time-to-market.
Anderson & Crocca (1993)	Learning from a co-development project	Co-development is when a company, together with its customer users, evaluates a new technology together with established work practice.
von Hippel (1986)	Launch the concept of lead users and a method	Lead users are users whose present strong needs that will become general in a marketplace in the future and are positioned to benefit significantly by obtaining a solution to those needs.
Martin & Horne (1995)	Successful versus unsuccessful innovations	Customer participation is defined as the direct, overt participation by the customer; their overall involvement. There is more direct customer participation for more successful service innovations.
Muller et al. (1993)	Taxonomy of participatory design	Participatory design is a process at the earliest stages of a joint development project where the customer is highly involved as a member of a team.
Neale & Corkindale (1998)	Co-development	Co-development is the process where the technology originator and the customer become intimately involved in an integrated or joint development project.
Shaw (1985)	Level of customer interaction	User-dominated where the user perceives the need for the product, conceives a solution, builds a prototype and proves the value of the prototype by using it.

There are several methods for customer participation as Table 2 presents. Lagrosen (2005) categorises the methods by the level of the relationship, but for the purposes of the thesis the listing of the methods is sufficient, so the level of the relationship is left aside. It is key to know the existence of the formal tools to understand the variety of ways to involve the customer. Mainly large companies use formal methods for customer participation.

Table 2. *Customer involvement methods in different level of relationship* (adapted from Lagrosen 2005, p. 433).

Level of relationship	Longitudinal customer involvement	Lateral customer involvement	Suitable methods
Transactional	Only in the early phases	Design for the customer	Surveys, focus group interviews, observation
Facilitative	In the early phases, in the testing phase and occasionally in the other phases	Design with the customer	QFD, Delphi method, conjoint analysis, prototype testing, beta testing, team customer visits
Integrative	In all phases	Design by the customer	Integrated product development teams including representatives of both the supplier and the customer

Open innovation and crowdsourcing can be used in business model innovation as well. Through crowdsourcing the company gets an access to resources of its partners such as customers. Those resources include etc. ideas, capabilities, knowledge and technologies of the customers. At the same time, the company must open up the business model to its customers (Djelassi & Decoopman 2013) and the details of the business model may leak to its competitors as well.

Customer participation can occur in three different stages. First, customer participation may be implemented in the design stage of the product or service (Cermak et al. 2011; Lusch & Vargo 2006). For example, customers must provide information about the need for tailor-made services because implementing the service requires at least some information of the customer (Kelley et al. 1990). Then again, for designing mass products, not every customer can begin to co-design products they are going to buy (Gouthier & Schmid 2003). At the design stage, tools such as brainstorming, focus groups, observations and surveys can be used (Lagrosen 2005, p. 427). Secondly, customers can also contribute during the delivery or during the production phase (Bettencourt 1997; Gouthier & Schmid 2003; Kelley et al. 1990). Third, the customer participation can occur after the delivery as well (Plé et al. 2010; Dong et al. 2007). After the delivery, tools that can be used to optimise offering are e.g. concept testing and prototype testing.

Customer participation has several positive effects. The knowledge level of the company increases through customer integration and the company can exploit a higher level of their knowledge to create a better offering (Lee et al. 2012). Furthermore, through customer participation, the company receives new capabilities and skills on top of the existing capabilities of the corporation (Chesbrough et al. 2006). Thus, through customer participation, customers can be considered as a resource of the company as discussed earlier. New capabilities can be used to see the current situation from the perspective of customers and to suggest ideas for improvement that benefit the customer (Möller & Törrönen 2003).

2.4. Customer participation in business model innovation

There are several studies of customer participation in a new product and service innovation (Kristensson et al. 2008; Lagrosen 2005; Lilien et al. 2002; Lin & Huang 2013; Nuojua & Tahtinen 2013). Lin & Huang (2013) suggest that in a new product or service development process a close customer relationship enhances the efficiency and effectiveness of the process. They, however, revealed that the close relationship may also hinder the innovativeness of the new products and services. Kristensson et al. (2008) propose that companies should get a realistic understanding of what customers need and desire. They continue that the heterogeneous roles are important in product development teams. In order to increase heterogeneous in the team, the team members can play the different roles they have in real life. Therefore, the team is more likely to obtain new, value-creating service and product ideas.

Despite the customer participation studies, customer participation in business model innovation is a fairly untouched research topic. Hence, the previous studies on the other research areas are applied on customer participation in business model innovation to supplement the scarce research of customer participation in business model development.

Studies of business models often view the customers as one of the business model components but finally, the research has gone further and the customer is now considered as “a content generator” so customers can be seen as the resource of the company (Plé et al. 2010, p. 258). The doctoral thesis of Pynnönen (2008) takes customer participation a bit further. He develops a customer driven business model in his study and acknowledges that the sooner a customer view is assimilated in an offering development, the greater is the generated customer value can be generated and the sooner it can be offered for the customer. He also highlights that a customer driven business model should have “a mechanism to recognize the customer value preferences and also the changes in them” (Pynnönen 2008, p. 34). Furthermore, business model decisions of the company should be based on the value preferences of the customers (Pynnönen 2008, p. 38).

This research continues the study by Pynnönen (2008) though the point of view is slightly different. He mentions the need for mechanisms to identify customer value and customer needs, but does not suggest any suitable methods. This study suggests some mechanisms and the whole idea is taken a bit further. In this study, mechanisms are used to identify business model improvement ideas from the customers. To enable customer involvement in business model innovation, methods of Lagrosen (2005) are applied to business model components.

The framework composes of two parts as Figure 6 presents. The components of business model are on the left side. As mentioned earlier, when one component changes, the other components need to be adjusted as well. This is illustrated by the reflexive arrows between the components. The right part of the framework contains three methods for customer participation. These methods are called design for the customer, design with the customer and design by the customer. The participation methods can also be named according to the relationship type of the supplier and the customer. These relationship types are called transactional, facilitative and integrative.

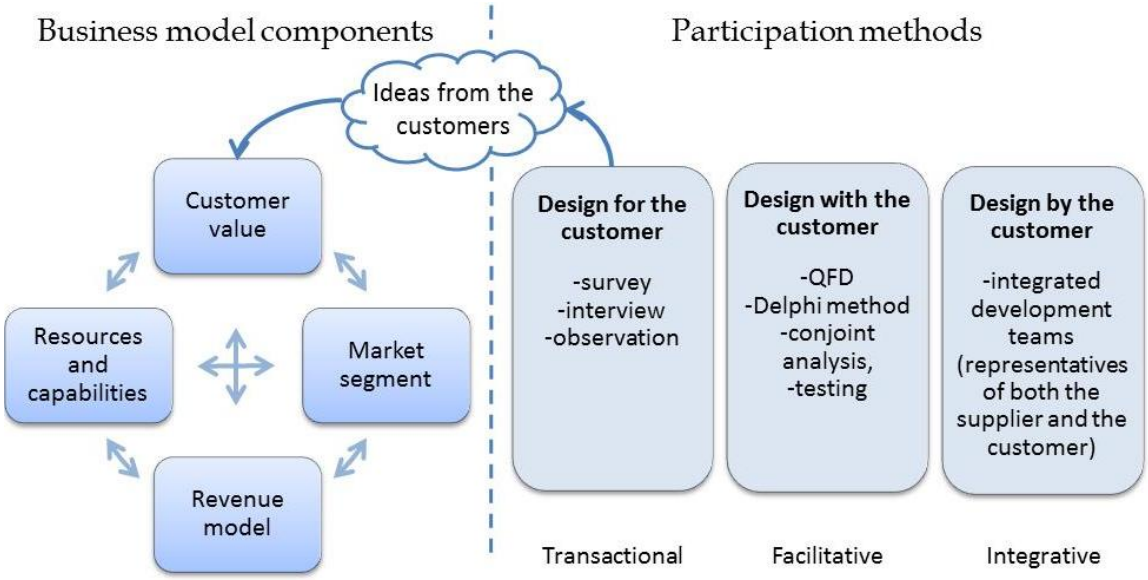

Figure 6. *Integration of customer participation methods and business model*

Not every method and every component can be piloted simultaneously. Therefore, a component and a method must be chosen. This thesis concentrates on testing the first method of Lagrosen (2005), which is design for the customer, to get both incremental and radical innovation ideas mainly for customer value component of the business model. In other words, business model innovation ideas are gathered from the customers by surveys, interviews and observations. Each of the methods can be either qualitative or quantitative, but this research uses mostly qualitative methods. In a qualitative interview, face-to-face interviews are conducted with participants (Creswell 2009, p. 181), who are in this case employees of the customer companies. During an observation,

the observer takes field notes on the activities and behaviours of individuals or groups at the research site (Creswell 2009, p. 181). The sites are in this case the manufacturing halls of the customers. Notes can be recorded either in an unstructured or in a semi-structured way and the role of observer can vary from participative to non-participative party (Creswell 2009, p. 181). After collecting the data, analysis and interpretation of people behaviour must be conducted (Saunders et al. 2009, p. 288).

Naturally, some ideas may occur in other components as well, though the main concentration is on customer value. As told earlier, when any component is changed, other elements must be altered as well. The alteration of the other components must naturally be conducted after customer participation.

3. RESEARCH METHOD

The purpose of this chapter is to justify the chosen research methodology in order to show that the study is based on conscious decisions. The selected research strategy is multi method multiple case study research. Data is collected through informal conversations, observations and interviews from three companies. The data is analysed using software, called Atlas.

3.1. Research strategy and methods

The research was conducted using multi method multiple case study research strategy since the main research problem is to understand how a company can utilise customer participation in business model innovation. This aim can be reached by investigating customers as cases and sources of data and information. As Yin (2009, p. 4) poses a case study is suitable for situations where a holistic view on a real life situation is desired. The method is also suitable as a research method when acquiring knowledge of an individual, group or phenomenon.

The research was done conducting a multiple case study in order to avoid uniqueness and artificial conditions (Yin 2009, p. 61). Several cases are useful when investigating some general phenomenon (Silverman 2010, p. 139), which in this case is the implementation of customer participation in business model innovation. Another benefit of a multiple case study is that results of first case can be verified in the forthcoming cases. As such, findings can be easily generalised. (Saunders et al. 2009.)

Moreover, multiple research methods were used in the thesis. Tashakkori and Teddlie (2003) state some important merits of multiple methods. First, multiple methods allows researcher to confirm that the results can be trusted. In other words, several methods are used to corroborate each other and thus, a form of methodological triangulation is conducted (Mason 2002, p. 33). The second aspect identified by Tashakkori and Teddlie (2003) is an easiness to make inferences when research data is collected from multiple cases through multiple methods. Third, different methods can be exploited to achieve different purposes. Silverman (2010, p. 132) justifies several research method in the case of several research questions and in this thesis there are different research questions.

In this study, the research methods used are literature review, observation and interview. The literature review was conducted in order to get familiar with the topic and to be able

to construct an interview structure. To form questionnaires for interviews and improve the structure of the interview, the activities in the case companies were observed. Observation also played an important role in confirming the data from interviews to be accurate.

3.2. Case companies

Saunders et al. (2009, pp. 212–213) state that due to impracticability to collect data from the entire population, a sample of the population must be selected. They continue that selecting a sample is also important when observation and interviews are used as data collecting techniques. Moreover, sampling allows the researcher to spend more time in each case company and thus enables concentrating on more detailed information.

Silverman (2010, p. 139) remarks that cases are seldom selected on a random basis. Saunders et al. (2009, p. 241) continues that sometimes there are difficulties to get permission of several companies to conduct the research in their companies whereas Silverman (2010, p. 139) claims that the case companies are very often selected because they allow the access. In this thesis, the case companies were selected by using convenience sampling (Saunders et al. 2009, p. 241). To get the access to the customer companies, the supplier selected suitable firms and contacted those companies. One of the planned companies denied the access and it was recompensed by another company.

The case companies are seen as customer companies in the thesis. In order to retain the anonymity of companies, no detailed information is given and customer companies are called CustomerA, CustomerB and CustomerC. The first case company is called CustomerA. It is a product oriented company and active in the engineering industry. CustomerA operates as a subcontractor for its clients. The offering consists mainly of customised metal-based products which the clients assemble in their products. Moreover, the case company offers services to design the products for the customers or with the customers. CustomerA produces some bulk products as well. Moreover, they have invested in quality assurance and appreciating green values.

The field of operation of the second case company is mining industry. Its offering consists of both industrial products and services. Like the first case company, the second company also offers both the concrete products and the designing of the products for the individual customers. However, CustomerB has a broad selection of other services as well and the services bring more than 40% of the net sales. The company operates both as an end product supplier for the customers and as component supplier.

The third case company operates in the field of the engineering works industry. The products of the company are parts of the bigger assembly and thus, CustomerC operates as a supplier to its customer. The products are mainly according to a product portfolio. However, CustomerC offers services related to the products and services create 40% of the sales. Total net sales are much greater than the net sales of CustomerA and CustomerB as Table 3 shows. Furthermore, CustomerC invests into renewing its offering and the company has recently broadened its service offering.

Table 3. *Information of companies*

	CustomerA	CustomerB	CustomerC
Net sales	40 million	7,500 million	4,700 million
Number of employees	200	30,000	20,000
Industry	Engineering industry	Mining industry	Engineering works industry

Customer companies have both similarities and differences. CustomerB and CustomerC are companies of the same size class when considering net sales or number of employees whereas CustomerA is much smaller. Moreover, CustomerA and CustomerC operate both on the engineering industry and CustomerB operates on mining industry.

3.3. Data collection

The empirical data was collected through three sources, which are informal discussions, interviews and observations, from three manufacturing companies. Multiple sources of data were used to ensure "that the data are telling you what you think they are telling you". As aforementioned, by observing the activities, the qualitative data from the interviews can be confirmed. (Saunders et al. 2009, p. 156.)

Developing an interview questionnaire contained a few steps. Before contacting the customer companies, both understanding of the topic and interview structure was formed based on literature review and previous research concerning the device with the automation features. The questionnaire was also improved after feedback provided by the supervisor of this thesis. Figure 7 demonstrates the development of the interview structure.

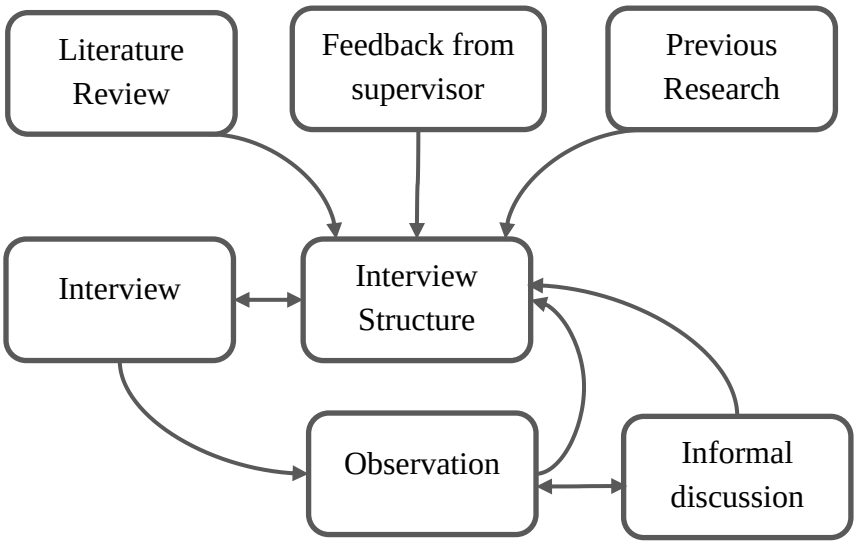

Figure 7. *Interview structure development*

Collecting the research data began in one of the case companies. Both a participative and structured observation of the use of the device were applied. Structured observation was used in order to identify device usage and participative observation in order to understand the reasons behind the ways of usage. During the observation, users of the device and managers were talked to, to understand the current situation and to improve structure and questions of the interview format. After that, users of the device were interviewed individually by using a semi-structured interview in order to identify the reasons behind the ways of device usage. During the first interviews, slight improvements were also made to the questionnaire.

After the first case company, the same process, which included observation, discussions and semi-structured interviews, began in the second case company. The biggest difference is that a few improvements needed to be made to the interview structure due to case specific issues. A few weeks after observation and interviews of the employees of the second case company, interviews of people who took part in the acquiring process took place. The reasons for this delay are business and summer holidays of the managers. The third case data was acquired similar to previous ones with the exception that the data was gathered during two days whereas in the other previous companies data was gathered over five and six days. Thus, the observation data is more limited as Table 3 shows. The interviews and observations were conducted during the visits on the companies and each interview session was carried out individually. When collecting interviewees in the case companies, convenience sampling was used (see Saunders et al. 2009, p. 241).

The semi-structured interviews had both similar and different themes for the users of the device and people responsible for the acquiring process. The themes concerned background questions of the interviewee, ways of usage of the device, opinion on new

automation features, customer value, acquiring process and future aspects. The interview questionnaires are presented in Appendix 1 and Appendix 2.

Despite the predefined themes, the order and structure of the questions was flexible. Case company respondents were generally project managers, supervisors and employees and can be grouped into two types: (1) manager respondents and (2) employee respondents. The interviews were conducted between May 2013 and September 2013. In total, 24 interviews were conducted within the participating companies. More details are given in Table 4. The interviews lasted from eleven minutes to one hour eleven minutes. The average duration of the interviews was twenty nine minutes.

Table 4. *Numbers of interviewees and observation days in customer companies*

	CustomerA	CustomerB	CustomerC
Number of observation and interview days	5	6	2
Number on interviews on the first round	9 employees 1 manager	4 employees 2 managers	4 employees 3 managers

Several recording methods were used. Every interview was audio-recorded and fully transcribed. Self-memos were used when recording observation notes. A researcher's diary was used to write down ideas and reflections of the researcher. Memos and ideas were written in this diary and stored in an electrical document in order to execute observations easier.

3.4. Data analysis

The analysis of the data had several steps. Self-memos and diaries were written and recorded in Microsoft Word documents. Every interview was audio-recorded and transcribed by an external provider. The researcher checked the transcripts due to some gaps in the transcript. Next, data was categorised (see Saunders et al. 2009, p. 492). The categories, or in other words codes, were based on the interview structure. Software, called Atlas, was used to code the transcripts. Corbin (2008, p. 66) emphasises that coding is more than making a list of codes in a computer program. He continues that coding involves interacting with the data by utilising analysis techniques such as questioning the answers and comparing the data in order to derive concepts out of the data.

An analysis of within-case data was made before a cross case comparison. The results were presented to the case companies in a written report in order to get feedback and to ensure their correctness and increase validity. After completing and getting the feedback from the case companies, a cross-case analysis was conducted to synthesise the findings

from the different companies. When writing down the results, comments were translated from Finnish to English, which may have caused slight differences and nuances in the comments.

4. RESULTS

This chapter presents the results of the research. First, the results are described case by case and after that, cross case analysis of the results is conducted. The results are connected to the new technology and its automation functions. Results of each separate case are from the point of view of the customers. However, the cross case results are seen from the perspectives of both the customers and the researcher.

4.1. CustomerA

CustomerA has put a new production line into operation recently. The line does not yet operate at full capacity. They have encountered some problems with the production machines. CustomerA has a similar device on an adjacent production line to the one in the survey. However, the former device has no automation functions and the new one has. Therefore, almost every user of the device has had a similar experience with the device. As such, comparing the new and the former devices is easy for them. The new device has been in use one year and two months at the beginning of the interviews and observations.

4.1.1. Important matters for CustomerA

Several important matters for the operations of the customer were found mainly during the interviews and informal conversations. One of them is an information flow within the company. Employees must know where they should be, what they should to do and where they should deliver the product after its processing. Another important issue is functioning of their main production machines. The reliability of the production machines and rapid maintenance is essential for the operations of CustomerA.

Features of the acquired device are not seen as important attributes for the CustomerA. The features have an ability to facilitate working but they do not revolutionise the production. Similarly to the main production machines, the importance of the new device arises when it is out of order or someone else operates it. Therefore, reliability of the new device is considered as an important matter for the CustomerA.

4.1.2. Technology in use

CustomerA has challenging tasks with the device. During a task, employees need to alter settings several times. Operating seems laborious. This could be avoided with

certain auxiliary equipment or accessories. After observing and discussing the matter with a manager, he told that they have planned to purchase certain equipment.

Observing revealed also that one of the functions hinder the operating of the employees. An object must be turned upside down between two work phases. When turning the object, the automation function tries to correct the position of the object, which disrupts the turning. Hence, the automation function is not suitable for this kind of operation and it should be turned off.

One of the functions is purchased in order to help a particular work phase. The observation revealed that the function is not necessary in this phase. Therefore, the futility of the function is the main reason for not using the feature. It seemed to be more bother to turn the function on when comparing the benefits of the function.

Several employees do not use one of the automation functions of the device. However, they need the function because one employee results in the feature manually although the device could do the function for him. When he uses the device, he continuously performs the function manually.

4.1.3. Value of the technology

When asked for the positive effects or value of the acquired technology, several aspects arose within both the group of managers and the group of employees. The new device enables defining working processes clearer than was previously the case. Working becomes easier when the ways of working are clearly defined instead of indefinable working methods and this can be done by utilising the automation functions. Experienced employees point out that the new features eases work and those features are useful especially for new employees. Inexperienced employees have no knowledge of managing problems manually and now they do not need to learn it because the automation function solves the issue for them. The employee just chooses a program and then press only one button and the device operates automatically.

> *"This line has been ramped up so that at some stage the 'button pressers' can be employed. They don't need programming skills and they don't need to control the whole process from the beginning to the end. In this way we release certain resources for other work. As everyone knows, in this field and in technology industry generally constant developing is vital."*

There are conflicting opinions of capability of the features to speed up the production. Few employees state that the new device is no faster to use than the previous one. However, most employees consider the new device to be quicker to use than the former device. An employee stated that in the long run some working hours can be saved due to automation. One explanation to the acceleration is decreased ineffective time.

> *"The time that is used for operations is reduced, because I don't need to wait for the next phase as I had to with the old machine. After conducting one phase I can directly move on to the next one."*

The second reason for acceleration of operations is the accuracy of the device.

> *"Operating with the new device is faster due to its accuracy. No more time is wasted redoing tasks because accuracy of the machine is sufficient."*

The third reason is the advanced control unit. It allows faster controlling of the device because several functions can be active simultaneously.

The control unit, however, raises varying opinions. Some employees like it and others prefer the control unit of the previous device. However, everyone thinks that the new control unit is easy to use and well designed. It has some extra buttons, but they do not complicate working with it.

The new technology of the device improves safety as well. Both the employees and managers consider this to be a very important aspect. New features forbid the device to conduct perilous actions which are possible with the older device.

> *"I don't need to go near an object that is involved in the operation. If something unexpected occurs, there is no-one nearby the machine and so only the object breaks down."*

One employee successfully compresses the content of several interviews.

> *"The biggest positive effects that I experienced are the convenience of use and then the safety. They were the head criteria. No pecuniary advantage can be found through calculations or if it is possible, they remain very small. We are not able to justify the features to any economic within the company if the safety aspect is disregarded."*

4.1.4. Emerged complications

Employees of CustomerA found several complications connected to the new device or its functions. The first main problem is that sometimes employees need to wait for the device to become available.

> *"Occasionally, our maintenance people operate the machine and then I may need to wait for hours. Usually, I don't need to wait."*

> *"If someone uses this machine, I use the old one. Sometimes both of them are in use and then I can't do anything else but wait."*

Therefore, they have too many users for the device or too few devices for the users. Moreover, CustomerA do not yet operate at full capacity. When it does, the waiting times become even longer.

Another issue found is connected to the degree of usage of the manufacturing capacity. The attention of the employees is mostly drawn to the needed improvements of their core operations in the production line. Therefore, the new automation device, which is not included in to the core operations, does not draw that much attention.

> *"We have substantial problems with our production machines due to the new production line. Those problems are bigger than any of the problems of the device which is in the survey. That is why we haven't sunk out teeth into the automation functions yet."*

Due to the ongoing ramp up phase, not all potential failures or defects have yet arisen.

> *"This production line doesn't operate at full capacity and so, the automation features are not in full use either."*

Furthermore, some features are found useless for CustomerA. However, employees do not claim those features to be useless for every company as an employee states: "T*hey just aren't useful for us".* To conclude, CustomerA does not use the features that are found to be unhelpful.

Sluggish mobilisation occurred and four main reasons for it were found. The first one is typical change resistance and the second reason is the possibility to operate the device manually. Thus, some employees use the device without the automation. These two reasons together decelerate the adoption of the technology remarkably.

> *"This device has a lot of new technology. As with everything new, there are some users that find it difficult to get rid of their habits of use. When problems with the automation have occurred, people have turned off the automation and have begun to use the device as they use the old one.*

The third reason is insufficient implementation. One person in the company is responsible for the training of the employees. He tells: *"The functions of the device have been looked through with everyone."* Despite this, some people do not even know the existence of the automation functions. An employee answered to a question about automation functions: *"To be honest, I didn't know that we have this kind of functions in the machine."*

Another employee explained that they have not had collective training. People have just taught each other. He does not comprehend the need for a broader training because he

finds using of the device to be quite easy. Another employee justifies the present level of the knowledge to be sufficient because: *"We haven't had any smashes or injuries though we haven't yet had the machine for a long period of time."*

Moreover, an employee complained that the device operates sometimes very slowly. He did not know that when the automation is turned off, the device functions more slowly than when it is turned on. Thus, extra training for the employees might be helpful.

One reason for unawareness is new employees on the production line.

> *"We have had some employee changes on this production line. Now we are trying to have a new start as we have new, more motivated people."*

An employee, who did not remember how the new functions should be used, justified the extra training by saying: *"Well, I can use the functions because I've been told how to use them. But we got a new fellow who has never seen how the features function so some training for everyone would be useful. I haven't used those features for a long time and relying on them may be difficult. I find it hard to believe that by pressing the button the machine does everything that it should do."*

Some people are so used to the old control unit that adjusting to the new panel takes some time. Furthermore, some people consider new control unit to be too large.

> *"It is there the whole time. I can't do as many things with my hands simultaneously as I can when I use control panel of the older device."*

4.1.5. Improvement ideas

Several improvement ideas emerged. One manager told the researcher that the supplier of the device has quite an intelligent data log system but CustomerA gets no information from it, though the information would be extremely useful for them.

> *"The screen of the software expert seemed functional. I've understood that they have a maintenance version of the software. It would be valuable for us to get some information from the software. It would be useful to produce an end user version of the same software. The end user version could be just for viewing not touching or then a main user or supervisor could get access to the software and they could check additional information of the error message. This would also be useful for the maintenance staff of both the supplier and the customer."*

The manager continues with the idea. He states that a control unit should be more informative because when an error occurs, it is difficult to know what the main reason of the error is. There could be, for example, a separate monitor where the extra information could be presented.

> *"It could also gather a log or give more precise information because at the moment, we rely only on the information of the small control panel."*

Some improvement ideas towards the details of the automation functions arose as well. An employee desired a quick automation function. The idea is that the automation program could be installed quickly and anyone could do it. Sometimes altering the features quickly would be useful for employees. This would ease the work of the device users. Furthermore, at the moment, the customer is not able to revise the automation installation. Enabling customising of the software to some extent would be valuable for the customer.

Another improvement idea arose concerning the control panel of the device. The dimensions of the control panel of the new device are too large according to a few employees. As an employee states: *"It would be great if the size of the control panel would be similar to the old one and all the functions could be in it."*

4.1.6. Purchasing

The purchasing procedures of CustomerA are told to be diverse. It was told that the purchasing practices change depending on the person in charge of each purchase or project. Another influence on purchasing is the preferences of the people. Proof of these diverse proceedings is the mixed bunch of production machines in the company. However, there is a positive effect to this as well, namely that CustomerA is not bound to any supplier. However, the diverse machine brands cause some anguish employees and managers.

This time, CustomerA did not seriously consider purchasing from the other suppliers though they asked an invitation for bids from several suppliers.

> *"In the competitive bidding, competitors didn't have suitable models because the whole system of ours is based on this supplier. We didn't have to buy from this supplier but it was reasonable to buy from them."*

After a first round of technical specifications, some staff from CustomerA got an invitation to the product demonstration at the location of the supplier. People who joined the visit were able to test the device in a test location. An employee describes the visit like this: *"We got a got a chance to test the machine and its features. We used the machine in different situations and we saw how it acted in those situations. The purpose of the supplier is to endorse the automation function because it's difficult to explain the features and their value for the customer without seeing them in reality."* Though the visit was seen as a marketing event, it was found to be useful for the decision making process. After testing, employees were more aware of the possibilities of the device. Thus, they were able to demand a certain type of accessory to the device.

Employees agree that asking the opinions of them is useful. An employee says: *"Talking with the users is recommended because we have a good understanding of the usage of the machine. We have a different perspective than the managers have."* Another employee points out that some features that were intended to be included in to the purchase, never made it into the final requirement list of the device. He does not know why those features were left out though those would have been useful for them.

4.1.7. Operations of the supplier

The behaviour and operations of the sales people were found professional, as a manager describes: *"Their sales team seemed top class to me, as it should be. We got answers to our questions quickly and the speed of the operations was great."* However, after closing the deal, sales people did not stay in touch with us. A manager describes: *"Mechanics were left alone with the project. Of course the technology is also new for them so they might have needed some support."*

However, a slight failure occurred. There were some delays in the schedule.

> *"When it was installed, some parts were missing. They had some problems with the installation of electricity and it took quite a long time before it could be tested. It was promised to take two days but it took more like three weeks. It didn't go as planned but luckily we were not in a hurry because other machines were also missing from the production line."*

The problem solving situation of the device needs improvements, because a poor practice emerged when the supplier tried to solve a failure of the device. CustomerA found it difficult to get maintenance men on their location. The first step went smoothly but difficulties occurred at the second step. It was quite easy to get a mechanic on the location. When he came, people of CustomerA were able to demonstrate the failure. However, the mechanic told them that they needed a maintenance person who understands the soul of the software. It was difficult to agree upon a time with the software expert to come to solve the situation. When the software specialist came to the location, employees of CustomerA were unable to demonstrate the situation. The reason of the failure in question remained a mystery.

4.2. CustomerB

The device has been bought for a new production line. Both the device and the production line have been in use 11 months by the time of the beginning of the research at the site of CustomerB. The manufacturing line operates as planned, though the volume of the production has not reached the maximum, due to low amount of orders.

CustomerB has hired and transferred people on the production line after the introduction of the new device. Thus, not everyone has got the briefing of the device which was given by supplier of the device. Unfortunately, the market situation is not bright and CustomerB consider laying off some staff which affects the interest towards the new device and its ability to improve the manufacturing process.

Furthermore, employees have on the manufacturing area a machine that is more difficult to use than the device considered in the survey. The machine that is difficult to handle has drawn more attention than the device with the new automation functions. Almost every employee had experience with using the similar device to the one that is in the survey but they had no experience with the other machine. After the interview and observation round, a person from the supplier company visited the site and end users had the chance to tell him their worries concerning the new device.

4.2.1. Important matters for CustomerB

CustomerB does not own machines prone to breaking down on their production line, or at least they have not encountered problems with their machinery. Therefore, the most important matter for the operations of CustomerB is accessibility of their tools. An employee says that working is not fluent if they have a lack of the tools or if the tools are missing.

The device in the survey is not an important part of their operations as long as it is in commission. However, if it is out of commission, the production of CustomerB stops almost immediately. An employee describes the situation: *"Our process is such that the device is one of the process machines."*

When important matters for the operations were asked from the managers, the answer was keeping up competitive tools and improving competitiveness. A manager condensed the idea as following: *"My personal opinion is that this is the right direction for developing. If there are automation features that speed up the processes and improves efficiency, we can't afford not to use them."* To conclude, automation functions were seen as important tools in competition.

4.2.2. Technology in use

Observation revealed that several functions are utilitarian for the operations of CustomerB. Employees used a few of the functions regularly. One of the functions seemed useful for the production area from the point of view of the researcher. However, only two of the employees occasionally use the function. They rather used the device manually. This function would be even more useful in the different type of manufacturing hall. For example the benefits of the function would get bigger

significance in the next production hall, which is much bigger and have bigger objects as well.

Employees must turn the objects with their hands which looks physically strenuous. Turning the object manually also cases a risk of injuries. The supplier has a facilitating function for that. It would ease the work and decrease the risk of injuries.

The functions seem to need some tuning. The features do not operate optimally at the moment. They would produce more value if they were trimmed for the purposes of the CustomerB. Time of operation, for example, would decrease due to more optimal movements.

4.2.3. Value of the technology

The new features of the device ease the daily job of the employees. When an employee was asked why he uses new features, he answered: *"I'm too lazy to use the device manually. I just need to choose the program, do the settings and the machine does everything else."* However, he does not use the automation in every part of the job. Some parts are easier to operate manually and then he does not use the automation.

Though the features ease the work of employees, he says that the features do not save his working time. Another employee sees the situation slightly differently. As the automation eases his job, he thinks that the production time would be longer due to assistance of the device. However, he considers the difference to be unnoticeable small so it does not harm the production. Due to longer operating time, he explains that he uses automation features. He claims that the value of the automation is easy working and whilst he is using automation features, he can have for example a chat with his colleague.

> *"It makes life easier. Well, it hasn't distracted my sleep though I don't sleep any better thanks to it. However, I can't claim it to be useless either."*

End users of CustomerB consider automation functions to be useful for new employees, similarly to the findings from CustomerB. First, the properties improve safety. Second, they simplify the job. An employee describes the situation: *"Automation functions are useful for beginners because when a complication emerges they can just cover their eyes and wait. – It is a good function."*

The technology would have saved a lot of money in the other manufacturing hall. An employee explains: *"This automation function would have prevented an accident on the other production line. Repairing the damages of the accident was worth a millions of euro."* A manager also believes that the functions can bring cost savings. He thinks that in another type of manufacturing, the device has ability to increase productivity

remarkably. He also says: *"Depending in a situation, this kind of device can easily replace two similar devices."*

The lifetime of the device is considered to be longer due to controlled ways of using the device.

> *"It (ways of usage) probably affects the lifetime of the machine. The functions protect the machine, especially its mechanical parts."*

> *"When one observes the ways of using the device, many ways can be found. When ways of usage are standardised, the lifetime of the machine is longer in the long run."*

The capacity of the device is adequate at the moment. CustomerB bought a device which has a bigger capacity that is needed at the moment. If the production needs changes, the capacity of the device is not immediately too small. An employee comments: *"Extra capacity is positive because our production might change somehow in the future."*

4.2.4. Emerged complications

CustomerB encountered slightly problems in getting new orders due to economic situation. As mentioned briefly earlier, CustomerB had before, and is again considering layoffs. This causes a negative atmosphere among employees. Moreover, the interest towards the new device and its automation features is low among managers. A manager describes the situation: *"We have had layoffs after the introduction of the device. These kinds of issues confuse the original plans of a production line profoundly."* However, these issues have not had a remarkable effect on the interest of the employees, or they hid it well.

Several reasons which have delayed the exploitation of the automation features are found. Some functions are simply useless for the CustomerB and employees are not motivated to use those worthless features. An employee stated: *"This kind of ordinary use needs only a few of the new properties."* In addition to useless features, some employees think that the bother is too substantial to turn the function on when comparing to the benefits of the function. Furthermore, three features are out of order. This arose during the visitation of supplier which the researcher had arranged. These two faults did not disturb any one, because employees were not willing to use them anyway. However, one fault did impede working at times.

Moreover, established usage habits of similar devices and difficulty to trust the automation functions have also delayed the exploitation of the automation functions. An employee describes: *"It just takes time to get used to it. It is a hard to trust that the*

machine can cope with the operations." Another employee states that the habitual way of using the device is the biggest reason for not to use the functions.

> *"I like to control the device it the traditional way. Somehow it has become a habit of operating. This is, however, the first machine which has these properties. Some growing pains have emerged among people… I have operated these machines normally for a long time. Surely it is the biggest reason for not using them."*

During the visit of the supplier personnel, employees had a chance to tell all the problems and worries that they had concerning the device. During this conversation, an installation mistake emerged. This would have not emerged if no one visited the location of CustomerB.

An emerged complication is shortcomings in the introduction of the device. Employees do not know how to use the new properties of the device as an employee told: *"I wish I could use the automation functions so that my work would become easier. -- In the beginning we tried the features but after that I've used the machine traditionally."* When every employee was asked, it was revealed that the most of the employees are incapable to use all the features. Half of them were able to use some features. A real reason for this may be insufficient commitment of managers. Another of the interviewed managers claims: *"Automation functions are easy to use for the employees."* He does not know the real situation on the manufacturing line because he argues that training of employees is sufficient because they have appointed an employee who is in charge of teaching new employees. The manager, however, notices that it might be useful to remind this employee of his responsibilities.

By the time of closing the deal, managers arranged a possibility for two people to get a broad training. Thus, those two people knew much more about the new functions. However, one of them no longer works with the device and the other has not set a clear goal to teach every new employee concerning how to use the features. When this situation was told to a manger, he describes the situation: *"It seems that we should've acquired a broader introduction for the employees so that they would utilise the automation. We could have managed to avoid some end users thinking that 'I didn't participate the training so I can use the device as I want'."*

4.2.5. Improvement ideas

The biggest share of improvement ideas came from the managers. One of the ideas that arose is customer service education for the staff of the supplier. The mechanic and installer work with the customers and thus, they do operate in customer service.

> *"It might be useful even for the mechanic staff to consider customer service, though we have had great men here. Those people function as a business card of the company, however."*

Another idea is more technical. CustomerB has bought a system that controls several similar devices simultaneously. However, the system was not commercialised properly and they had to conduct some changes. One of the interviewed managers considered this to be a suitable addition to the automation functions of the supplier. This manager recalls that the system should be able to retrofit to the older devices as well. The system would both save money of the customer and increase the safety.

Though the properties of the device are seen useful, they are considered to suit even better in other types of production lines. An employee gives the example of another production hall at their location where those features would be more useful than in the hall where he was working earlier. He also gives an example of an accident that took place in the other production hall. He points out the automation features would have avoided this misfortune. At the end of his report of the accident he mentioned: *"However, the properties are not totally useless here but in the other hall they would be more useful."*

The employees of CustomerB have some improvement ideas as well. They would like to have an instruction manual nearby the new device. This might increase the usage of the automation properties. They only have a manual for maintenance staff and they find it totally useless for them. The need for a certain type of auxiliary tool was also mentioned by some employee.

Several ideas emerged concerning the introduction of new technology as well. As aforementioned, a manager expressed the need for training of every employee. He suggests that the training should have two phases. During the first phase, the employees could go to the location of the supplier. There they could learn everything that concerns new functions without interruptions. However, at the work place there are always some sorts of distractions. The second training could be arranged at the end location of the device, this means at the production line. During the second phase, automation functions can be tested in the right environment. Moreover, the last tuning can be done during the same visit and the end users preferences can be asked. The manager adds that the period of time should not be too long between the first phase and the second phase. An employee suggested similar ideas. He says: *"The introduction should take place when they begin to use the device. Of course after a while, there could be another event because some of the learned things will be forgotten.*

A couple of managers and employees got a chance to test the device before closing the deal. This testing increased commitment to the new technology. A manager described

the situation: *"Implementation of these investments requires commitment of employees. A contribution to this commitment was the trip of employees to the testing location, because naturally they all had doubts. "*He continues with the attitude of managers: *"Immediately after testing the automation functions, we began to like it. -- It was a determining factor that we were able to test the features before a purchasing decision.* Another manager reveals that after testing, they got the permission to acquire the device in question. He highlights the importance of concrete testing because the value of the automation is difficult to justify by words only. Therefore, giving potential buyers the chance to test the new technology at the location of the supplier is highly recommended.

4.2.6. Purchasing

The purchasing process of CustomerB has several phases. They began the process by clarifying the need and technical requirements. After that they contacted prospective suppliers and called for bids of standard devices. A manager explains: *"When we call for bids, it is not just asking for a price but also untangling the available technology."*

If the device in question is not a standard model, they arrange meetings. During the meeting rounds CustomerB visited the supplier whose device is in the survey. During the visit, technical details were discussed and after the visit a proposition of a deal was drafted. When all bids were received they were compared. At a certain point they realised that no competitor had similar functions, so the negotiations were continued with only one supplier. To be exact, two suppliers had similar properties, but only one had the properties that were brought into commercial production. The commercialised properties of the device were a crucial factor at that time.

CustomerB considered the automation features to be important because CustomerB wants to invest in new technology in order to stay competitive. Another factor that affected the selection procedure is that CustomerB tried to acquire similar device before, but at that time the supplier did not have a product that was in commercial production whilst this was a requirement for CustomerB. The manager described the situation: *"The time was ripe for us to take a step forward. -- The additional price was not that high because we needed a good machine that has a high utilisation rate."* Thus, the price was not the most important matter because CustomerB wanted to have these new properties and this exact device.

There were several criteria for the comparison of the bids. First, the price was not extremely important for CustomerB but the image of the supplier was considered carefully.

> *"One reason for choosing this supplier was the image of the supplier. The previous purchases have run smoothly and we have been satisfied to the products of this supplier. -- The best machines that we have are from this supplier."*

Second, the degree of domestic origin was also one of the crucial factors. A manager explained that the products of the chosen supplier are almost domestic and that other suppliers just assemble their products from the subcontracting parts.

Third, proximity of the maintenance people was also considered when comparing offerings. A manager explained: *"We wanted to make sure that we can get service from nearby. Because these features are rather new, something that requires maintenance may occur and the maintenance company from which we buy our services doesn't have the knowledge of these functions."*

When managers were asked about the acquired services, another manager states that the only service they acquired is warranty. He continues that they did not get a longer warranty than the typical one. However, another manager sees the situation differently.

> *"We bought the device and the services as an entity. The installation and commissioning test were included and also the introduction of the device for the employees."*

Another of the managers suggested that the supplier could ease the procurement for the customers. The supplier could offer broader services which could include for example contacting an engineering office and operating with them if the supplier does not have the required know-how. The supplier and the engineering office could design the production line together or at least the location of the device in question.

4.2.7. Operations of the supplier

The behaviour of the supplier was seen as mostly adaptable and professional. A managed described: *"Both the sales and technical people were very professional. The guy, who was in charge of the installation, is familiar to us. He did his job well as usual. I could see the expertise of all of the stuff of the supplier."*

According to managers, the salespeople understood the requirements of the customer and they were able to put themselves into CustomerB's place. Furthermore, in the sales negotiations the atmosphere was unaffected.

> *"My experience of these (sales) people is that we have a unaffected and dialogic ambience in the negotiations. We don't have these old-fashioned rounds of reduction of the price. We discuss openly everything; the need, situation and even pricing."*

Working with maintenance was also pleasant. A manager explained: *"They organised almost everything themselves. Nobody needed to keep an eye on them because they obeyed our safety regulations religiously."* He continues that the same guys have been

at CustomerB's location before so they were familiar with the places and people. They are sociable and it is easy to get along with them.

The installation went according to plan, though there were slightly delays. Those delays did not affect the timetable of the whole project. The installers were not distracted by anything, not even the delays. The manager highlighted that every company needs these kinds of men. They are the ones who present the supplier at the location of the customer for several days. He adds that investing in great staff is always advisable.

4.3. CustomerC

The device was purchased in order to replace a previous machine. All the employees have operated the previous device because no new employees are hired recently. Therefore, employees are capable to compare devices.

The previous device on the production line was seen as both unsafe and unreliable. Due to remarkable inferiority of the previous device both the employees and the managers are pleased with the new device. On the other hand, CustomerC operates the device for two months only by the time of the visits at CustomerC's site and they only have a few automation features.

4.3.1. Important matters for CustomerC

The most important matters for CustomerC mainly concerned their manufacturing area. CustomerC had a cramped production area at the time of the survey. Therefore, both the managers and the employees consider sufficient amount of vacant area in the production hall to be important. Employees need free place to lay unfinished products and if a part that is ahead on the manufacturing line is not complete, they cannot proceed with their stage of production either.

Some of the important matters for the CustomerC were the same as the important matters for CustomerA and CustomerB. CustomerC considers information flow as a significant issue. If employees do not have the information that is needed for their job, they are unable to work. Therefore, a smooth information flow is essential for them.

The device in the survey is not deemed as one of the most important issues. Employees said that it is enough that the machine is in working order. However, they notice that if the machine is dysfunctional, their operations stagnate quite quickly. Thus, the reliability of the device is important for CustomerC.

4.3.2. Technology in use

The area of the operation is very narrow. Due to the cramped production area employees need to stay close to the device which causes a safety risk for the employees. Hence, operating the device needs vigilance and no errors are allowed.

The device has an unpleasant characteristic. When an employee begins to operate the device, the cooler of the device begins to make loud noise. The noise is not a big problem but is annoying and when someone needs to listen it day after, it becomes even more irritating. When the noise begins, the voice of radio cannot be heard.

New auxiliary equipment has recently been bought and it has not being tested before. A manager decided that the second day of the observation was suitable for testing the equipment due to a low workload. The testing went according to plans but it revealed that when operating the equipment, the employees must work even more carefully than previously due a big size of the equipment.

4.3.3. Value of the technology

CustomerC highly values the new device and its properties. Several positive effects were identified during the interviews and the observation days.

The safety of the staff has improved very much because of the new device. One of the production phases does not need as many people nearby to operate the device as the old machine required. Moreover, those employees previously had to use muscular strength but this is not necessary anymore. In addition to previous aspects of safety, the controllability of the device is better than the controllability of the former device. Not everyone had the courage to use the old machine because so many near misses occurred. An employee described the situation: *"The old machine was a total catastrophe. The only available direction was forward."* A manager also points out that the purchase was justified by safety aspects.

The production time is reduced due to new device and its functions. There are several influencing factors to this. The first one is a feature which allows the employees to skip one production phase entirely. Before acquiring this device, employees had to conduct the phase with another machine but at the moment the new device does it for them. An employee explains: *"We don't need to place the product onto a separate machine, operate the machine and take the product off. This quickens our work heaps."*

The accelerating function also saves time, because there is no need for changing to a supplementary apparatus.

> *"However, the new machine is slightly slower to operate than the old one but when considering the total time; working with the new machine is faster."*

> *"Making the changes to the previous machine took up to half an hour."*

Now that the changes are not needed anymore, it can be said that the machine saves a half an hour.

The last aspect that reduces production time is the remarkably reduced maintenance time.

> *"It isn't any quicker to use, but it isn't on the blink all the time so it saves our time. The old one had some sort of faults all the time -- and I think that the maintenance costs have reduced as well even though we just got the machine so we can't know how it works when it's older."*

4.3.4. Emerged complications

Some complications have occurred despite the short time of use. One of the most remarkable ones is that employees see learning the new practices as challenging.

> *"To be able to adapt to the new ways of using the device takes some time and learning. A certain type of working is imprinted in our minds and now that there are these new features, it isn't that easy to change the old practices."*

Though the habits of the operating must be modified, no resistance to change was found among employees of CustomerC. A reason for this may be the inferiority of the old device. Everyone just wanted to have new, safer device and that is why the resistance to change was not detected.

There are some obscurities with the usage of the device. Not everyone knows how to use the machine in the desired way because some did not have a chance to participate in the training. An employee tells: *"I got only a five minute training... I didn't attend the training event of the supplier."* Some complications have occurred related to the automation function. However, they occurred because of the own systems of CustomerC.

4.3.5. Improvement ideas

CustomerC had several improvement ideas. The first idea is related to the loud noise. Employees contemplated the need for cooling so often. Moreover, the cooling time could be shorter. However, they do not consider this to be a very big problem. They told that they just are not used to the cooling noise.

The device has a warning light. The light cannot be seen from every corner of the manufacturing hall. The employees suggested that the warning light could be placed on both sides of the machine. By retrofitting the other light, the safety would improve.

The new device has given some fault codes. The employees did not know how to react in these situations. One employee was told how to get more information during the errors but this did not help the others. Those less accomplished end users requested a user manual of the device. An employee suggested that there could be table of the potential fault codes and recommendations for action in each situation.

One more technical improvement idea arose as well. An employee said that it would be useful to have a function which centralises the item in the machine. This activity would both improve the safety and save time in contrast to manually centralising the item.

One improvement idea concerned sales people as well. A manager explains: *"They could have highlighted the new properties somewhat more. It is however… our people may change. When we are buying a machine next time, there might be different buyers. In that regard, those functions should be presented more. They should bring out them more and suggest solutions for customers.*

4.3.6. Purchasing

CustomerC had planned the purchasing of the device for several years. However, something more urgent always occurred and *"this device had not got into to do list of acquisitions"* as a manager describes the situation. There were two major aspects that inspired the purchase at this time, even though the previous device was not very old in the CustomerC's scale. The first aspect was a prospective new product portfolio which demanded the acquisition. The second aspect was a safety concern. The old device was slightly hazardous to use. An employee clarifies the situation: *"People at the higher level of the organisation were aware of the danger caused by the old machine. The problem was earlier that there was no money to be invested in the renewal of the machine. I think there have been plans to renew it for four or five years. – As far as I know, another reason for the purchase was a new product type."*

The managers were told to invite several tenders. A manager describes the progress: *"I haven't participated before such an exotic process. We had to call for bids even in China. Plus, in the beginning, we had a Norwegian person responsible for this purchase. Quite soon, we discovered that it's nonsense to have a Norwegian person handle a Finnish project. We got a person from our office to be responsible of the purchase though these machines were not his speciality. I should return to the topic again, there aren't that many suppliers when considering high capacity devices. I've learned from experience that there are two suppliers whose offers should be taken."*

Two end users were involved in the acquisition process. They specified the requirements of the device and selected the automation functions to be acquired. Of course, those two men asked opinions of other employees before the decision.

The managers of the CustomerC got a chance to test the device. They were able to use the features by themselves after seeing a video clip of them. After testing, the benefits of the properties became clear to the managers.

> *"The testing convinced us that the device is modern. We have a long history of working with these devices and these functions are just what we have been waiting for from suppliers. -- Seeing the properties in use eased the decision. Now that we have it in our manufacturing hall, we can say that before the next acquisition we will go and try it. You will see how it works. -- We wanted to have these new functions in order to get the experience of using them."*

CustomerC composed comparison lists of received bids. There were two separate lists: must-haves and nice-to-haves. Factors such as technical specifications and price are examples of the five items on the must-haves list. Every requirement of the must-haves list must be fulfilled in order to get into the second comparison list. The nice-to-haves list comprised of ten items and each item has its individual weighting coefficient. The revealed items are price, maintenance and delivery reliability.

> *"I would say that we chose the one that had the best entirety. -- It wasn't the cheapest one but its properties brought it to the lead position. -- Moreover, the company is both a reliable supplier and manufacturer. We have previously bought from them and they understand our needs perfectly. It is easy to work with someone who knows what we want. -- This is easier for a domestic product than for a Chinese product. At least we know that the specifications are really those that we defined."*

In Finland there are two suppliers with whom the last negotiations are typically conducted. The technical aspect of both is said to be similar, so the decision was based on some slight differences between the competitors. Typically the price matters in these situations. A manager comes back to the Chinese competitors: *"Chinese products were remarkably cheaper, but they weren't cheap enough to take the risk that comes with them. Moreover, there were difficulties with the timetable of these suppliers. We wanted shipping to happen in a certain week; towards the end of the summer holidays."*

CustomerC does not think that they bought services. However, they bought the device as mounted, installed and tested. Moreover, CustomerC gets a report of the usage of the device after a year which can be considered as a service as well.

4.3.7. Operations of the supplier

CustomerC reported to be pleased with the work of the supplier. Sales personnel of the supplier understood CustomerC's requirements well. A manager highlights that the sales people were professional in their job. He explains: *"They presented several automation functions, but they understood the prospective usage of ours so they did not push us to buy properties that we don't need."*

Sales people had also a successful vision of fitting the device into our manufacturing hall according to a manager. Preparations of the mounting were done well as was the mounting and installation. The manager describes actions of the installation personnel: *"They came on the appointed time and began to work immediately. They fitted the machine in the first day. It was very impressive. I could see that they have done it several times. The installation also went according to the timetable. The installation personnel surely knew their job and they even were nice people.*

In total, the whole acquisition of the new device went very well. A manager said: "*It was again* a *well-planned and managed project. I like how they did their job independently –we didn't need to interfere their job. It was even better to stay out of the way. You can pass on our positive feedback."* The manager continued that to him it seemed that the supplier could have shortened the installation time because the supplier did not need such a long fitting time.

Only one negative aspect arose during the interviews. The supplier did not send their tender when it was asked. CustomerC had to repeat the request to get the tender. However, a manager of CustomerC said he understands that. He explained: *"We have asked several bids of the same machine because we have planned the renewal for several years. The supplier may have thought that they are calling for bids again without proceeding with it."*

4.4. Cross case analysis

This section concludes the previously presented results. Main differences as well as main similarities of the customers are discussed. Table 5 shows both congruent and dissimilar background information of companies.

Table 5. *Background of each customer*

	CustomerA	CustomerB	CustomerC
Reasons for acquisition	A new production line	A new production line	Unreliability and unsafety of the prior device
Situation of the production line	Ramp up phase on a new production line	Ramp up phase on a new production line	An old production line
Other production machines	Most of them are difficult to operate	One machine that is more difficult to use	Not many of them are difficult to use
Operating time of the device	14 months	11 months	2 months
Employees	New people hired	New people hired	No new people hired
Comparison between the new and old devices	Capable to compare to another device of the supplier	Capable to compare to devices of the competitors	Capable to compare to the prior device of CustomerC

CustomerA and CustomerB are found to be quite similar. Both of them have bought the device on a new production line, they are still in the ramp up phase and they have hired new people. CustomerC acquired the device in order to replace an old machine. This makes the situation slightly different to the other customer companies because CustomerC does not have a new production line nor the complications that come with that.

Furthermore, CustomerC has had the device for two months only, whereas CustomerA and CustomerB have had the device more or less a year. Furthermore, almost every employee of each company has used similar devices previously.

4.4.1. Important matters for the customers

Both similar and differing matters were found as an important factor for customers. These are presented in Table 6. The first similarity is the importance of a good information flow. Employees of CustomerA and CustomerC complained about poor information flow within the company. Employees of the both companies consider a smooth information flow to be important for them.

There is a lot of variation in an importance of reliability of performance of the manufacturing machines. CustomerA claimed that reliability of the manufacturing machines and rapid maintenance is important because they have had malfunctions in their machines. However, CustomerB does not have easily breakable machines and CustomerC did not even mention this topic.

Table 6. *Comparison of important matters for the customers*

	CustomerA	CustomerB	CustomerC
Information flow	Smooth information flow is important	No comments	Smooth information flow is important
Reliable performance of manufacturing machines	Rapid maintenance and reliability is important	No easy breakable production machines	No comment
Other important issue	No comment	Accessibility of production tools	Sufficient amount of vacant area in the production hall
Features of the acquired device	Not seen as important attributes	Not an important part of operations	Not one of the most important issues
Reliability of the acquired device	If out of order, the production stops shortly	If out of order, the production stops immediately	If the machine is dysfunctional, production stops eventually

Two collective important matters for each company are found. The first common point is the device is not seen as important for the customers. The second significant matter is related to that. When customers were asked they were able to identify that the reliability of the device is important, because the production of each customer pauses at some point if the device is unable to operate.

A trend can be found in the important issues. Customers have had complications with each item that they claimed to be important for them. Therefore, the importance is based on complications or defects they have faced. None of the customers encountered severe problems with the devices and that is why the device was not seen as important for them.

4.4.2. Technology in use

Every customer must turn the object. CustomerA turns the object upside down and CustomerB and CustomerC turn the object horizontally. Auxiliary equipment would ease CustomerA and CustomerB to turn the object whereas CustomerC has already equipment for that. Table 7 presents the information.

Table 7. *Comparison of technology in use*

	CustomerA	CustomerB	CustomerC
Turning the object	The automation function disrupts turning the object upside down	Employees turn objects with their hands	The object must be turned around
Auxiliary equipment	Auxiliary equipment would ease working	Auxiliary equipment would ease turning the object	Auxiliary equipment turns the object
Automation functions versus manually	One employee results in the feature manually although the device could do it.	Employees use the device manually though the function would ease working	Automation functions are broadly used
Other matters	One of the purchased function not needed	The functions need tuning. They would produce more value if they were trimmed for the purposes of each customer.	The device makes unpleasant noise. Employees need to stay close to the device due to cramped production area. Hence, operating the device needs vigilance and no errors are allowed.

CustomerC uses the automation functions broadly though CustomerC has fewer functions than CustomerA and CustomerB. CustomerA and CustomerB do not use all the function that would help their working. Other matter that emerged during the operation are presented in the last row of Table 7.

4.4.3. Value of the technology

Revealed customer values of the technology are found to be quite similar. These are listed in Table 8. The first common value is the ability to ease working. Each customer thinks that the features ease their job and CustomerA and CustomerB highlighted that the features are useful especially for the new employees because they do not know how the situations can be handled manually.

Table 8. *Comparison of value of the technology for the customers*

	CustomerA	CustomerB	CustomerC
Ability to ease the job	Convenience of use. Features are useful especially for new employees and less experienced ones	Features ease the daily job. Useful for new employees	Previously, work required use of muscles. Previous manual work now unnecessary
Time savings	Production time reduces: -No unnecessary waiting and position alteration -Several functions can be conducted simultaneously	Ability to increase productivity: -Device can replace two similar devices -Lifetime of the device is considered to be longer	Reduced production time: -Employees can skip a production phase entirely -No need for supplementary apparatus changes -Reduced maintenance time
Cost savings	In the long run some working hours can be saved → cost savings	Lengthened time before renewing the device	Reduced maintenance costs
Safety	Improved safety	Improved safety	Trustworthy device controllability. Exceedingly improved safety

The second and third common value is time and cost savings. CustomerA and CustomerC identify the reduction in production time whereas CustomerC highlighted the ability to increase productivity. See more details in Table 8. The fourth mutual value is improved safety. This is seen as the most important value of the device.

4.4.4. Emerged complications

CustomerA and CustomerB have had more complications than CustomerC and the complications of CustomerA and CustomerB are mostly similar, as Table 9 demonstrates. CustomerA and CustomerB have acquired some features that the end users find useless for them whereas CustomerC utilises each acquired function. A reason for this might be the amount of features. CustomerC have just few automation functions whereas both CustomerA and CustomerB have several functions.

Table 9. *Comparison of emerged complications*

	CustomerA	CustomerB	CustomerC
Focus on other issues	Employees concentrate on improving their core operations	Attention of managers on layoffs. Insufficient commitment of managers	No comment
Failures of the device	Some failures or as the supplier states 'characteristics' emerged	Three features out of order. Installation mistake emerged	Few faults. Potential defects of the device not necessarily arisen
Features not in use	Some features are found useless	Some functions are found useless. Too big a bother to turn the function on when comparing to achieved benefits	All of the few features are in use
Usage habits	Adjusting to the new panel takes some time	Established usage habits delay the exploitation of the new functions	Slightly difficulties to adjust to the new operation ways
Resistance to change	Significant resistance to change	Some change resistance noticed	No change resistance noticed
Inadequate knowledge	New employees do not know how the device should be operated	Most employees are incapable to use all the features	Not everyone knows the desired way to use the device

Furthermore, employees of CustomerA and CustomerB have more difficulties to adjust to the new habits of usage than CustomerC has. A reason for this might be an amount of usage times per work shift. Employees of CustomerA and CustomerB use the device several times during the shifts and thus, they are quite experienced users of the device. The usage of experienced users is often very habitual and altering the habits takes lot of time. Whereas, employees of CustomerC uses the device only a few times per work shift and thus, the usage ways are not very habitual. As explained in the previous section, the automation functions ease the work of the new and less experienced employees the most. Therefore, employees of CustomerC do not have that much problems with adapting new habits.

A shared complication is inadequate knowledge of suitable ways of usage. CustomerA found that their new employees did not know how the device should be used. Most employees of CustomerB were unable to use the features and CustomerC has some employees which do not know the desired usage.

CustomerC has a remarkably smaller amount of emerged complications than CustomerA and CustomerB, as Table 9 demonstrates. Two reasons can be put forward. The first one is fewer number of automation features and the second reason is shorter usage time of the device.

4.4.5. Improvement ideas

Customers had quite consistent improvement ideas with the exception of a few less important ideas, as Table 10 demonstrates. Four broad improvement ideas arose. The first one is training. Each customer company lacks the knowledge to use the device as desired. CustomerA's main user of the device had planned training for each employee but due to complications in the manufacturing process it was adjourned. A manager of CustomerB suggested a supplier to offer training in two phases and a few employees of CustomerC said that they would like to participate in training session.

Another congruent improvement idea is the additional information for customers. CustomerB and CustomerC highlighted the need for an instruction manual which would include information of the fault situations and suggestions how to act when errors occur. CustomerA was more innovative because a main user had more knowledge of the systems. He suggested a separate monitor from which additional information could be read.

Every customer company found the chance to be able to test the device at the location of the supplier useful. CustomerA's employees who got a chance to test the device before the acquisition were found to be more committed to utilise the automation functions. They also encouraged other employees to use the features. Managers of CustomerB considered the experiment to have a significant role in their decision process. Thus, they suggested that the supplier should offer a chance for each potential customer to test the device before the procurement decision. The role of real life testing was also remarkable for CustomerC. The testing highlighted the modernity of the device and affected the selection of the supplier positively.

Table 10. *Comparison of improvement ideas of customers*

	CustomerA	CustomerB	CustomerC
Training / Introduction	The main user of the device had planned teaching end users	Two phases training: 1st at the location of the supplier 2nd at the end location of the device	People who did not attended the training, would like to be instructed on new functions
More information	Information log of device usage useful for customers Screen to get more information about the faults	Instruction manual nearby the device	Manual of the device for users Table of the potential error codes and action recommendations for each situation
Testing of the device	Employees who tested the device were more committed to using the automation functions. They also encouraged others to use the functions	Difficult to justify the value of the features. After testing, instant permission for acquirement. Each potential buyer should test functions	Testing proved the modernity of the device and eased the selection
New feature ideas	Quick automation function Adjustability of some other functions	Control system of several devices	Function which centralises the item
Other ideas	The control unit should be more informative and smaller	Customer service education for the people of the supplier Features more useful in another manufacturing hall	Sales people could highlight functions more. Shorter cooling time. Warning lights on both sides of device

Moreover, each customer suggested different improvements concerning both the automation features and other issues. Those ideas are presented at the end of the Table 10.

4.4.6. Purchasing

Purchasing procedures are found to be diverse and only few similarities can be found. A common aspect concerns inviting tenders. Each customer invited several tenders though each of them had only a few worthy suppliers in their minds. Every other aspect of the purchasing process is different for all customers. Customers' given requirements and reasons for acquiring this device were totally different, as Table 11 shows.

CustomerB is the only one who understands that they acquired services as well. CustomerA and CustomerC bought no services according to the managers. However, each of them bought several services for example the ones that CustomerB listed: warranty, installation, commissioning test and short device introduction for the employees. CustomerB suggested that the supplier could offer broader services and gave an example. Co-operation with engineering offices would be useful for the customers as well as the aforementioned end user training which should have two phases.

Table 11. *Comparison of matters concerning purchasing*

	CustomerA	CustomerB	CustomerC
Tender invitations	Did not consider other suppliers seriously although they called for bids	The negotiations were conducted between two suppliers though more tenders were received	Asked several tenders. Some even from China. However, the last negotiations were with two Finnish suppliers
Requirements	No suitable models from competitors. The whole system is based on this supplier	Image – important Degree of domestic origin – important Maintenance vicinity – important Price – not important	Two requirement list: Must-haves: technical specifications, price Nice-to-haves: price, maintenance, delivery reliability
Reasons for buying this device	No suitable models from competitors. The whole system is based on this supplier.	A commercialised product was a crucial factor. Wanted to acquire new technology	The entirety
Acquired services	Did not buy services according to them	Warranty, installing, commissioning test, device introduction for the employees	Did not buy services according to them
Inclusion of the end users	A couple of end users, but did not execute their wishes. Acknowledges that asking users enables a broader perspective	There was no-one to ask	Two end-users asked opinions of other employees before specifying the requirements and selecting functions to be acquired

Input from the end users might be related to the resistance of change. CustomerA has the strongest resistance to change as Table 11 shows. A reason for this can be found in Table 11. CustomerA asked opinions of some employees though in the end they did not

execute their wishes. Some features and accessories were left out which the employees found disrespectful. CustomerB had no employees to ask and CustomerB has less resistance to change than CustomerA. The CustomerC involved end users to the acquisition and opinion of each employee was asked. This can be seen in the resistance to change because there is no change resistance. Of course there are some other reasons than that which affects the resistance to change.

4.4.7. Operations of the supplier

Table 12 presents a brief cross case analysis of operations of the supplier. Each customer company said to be pleased with the work of the supplier. They mentioned that the supplier understood their needs. The personnel of the supplier was able to operate on their own and needed no one to watch over them.

Table 12. *Opinion comparison concerning operations of supplier*

	CustomerA	CustomerB	CustomerC
Personnel of the supplier	Professional behaviour and operations	Expertise of all of the stuff of the supplier is tangible	Pleased with the work of the supplier
Schedule	Delays in the schedule, but this did not delay the whole project	Slightly delays occurred in the installing though this did not delay the project	The installation went according to the timetable

CustomerA and CustomerB faced delays in the schedule. The delays did not affect the schedules of the entire projects and thus, those delays did not cause a bad impression. CustomerC faced no delays and a manager said that they could have booked even a shorter installation time.

5. IMPLICATIONS OF CUSTOMER PARTICIPATION IN BUSINESS MODEL INNOVATION

This section presents new information that is derived from the results. The results are linked to the previous studies. Similarities and differences of the results of the thesis and prior studies are reflected upon in this section as well. This section is composed of several parts. First, numerous benefits of the utilised participation methods are discussed. Second, challenges in the participative business model innovation are reflected. Third, the framework is considered as suitable for customer participation in business model innovation. The fourth section reflects upon the benefits of participative business model innovation and the fifth part describes general challenges for customer participation in business model innovation.

5.1. Improvement ideas of customers on business model

Each of the customers had several improvement ideas. Some of them were less realisable than the others. The most reasonable suggestions for improving the business model are presented in Figure 8. Though the customer value was the target of the improvement ideas, some other suggestions come up concerning the other components as well.

Several suitable improvement ideas emerged towards the customer value. The most remarkable are a need for more information such as log information, more informative control unit and instruction manual. Need for training service and checking service also arose. Furthermore, customers had more specific ideas such as quick automation function, centralising function and control system of several devices.

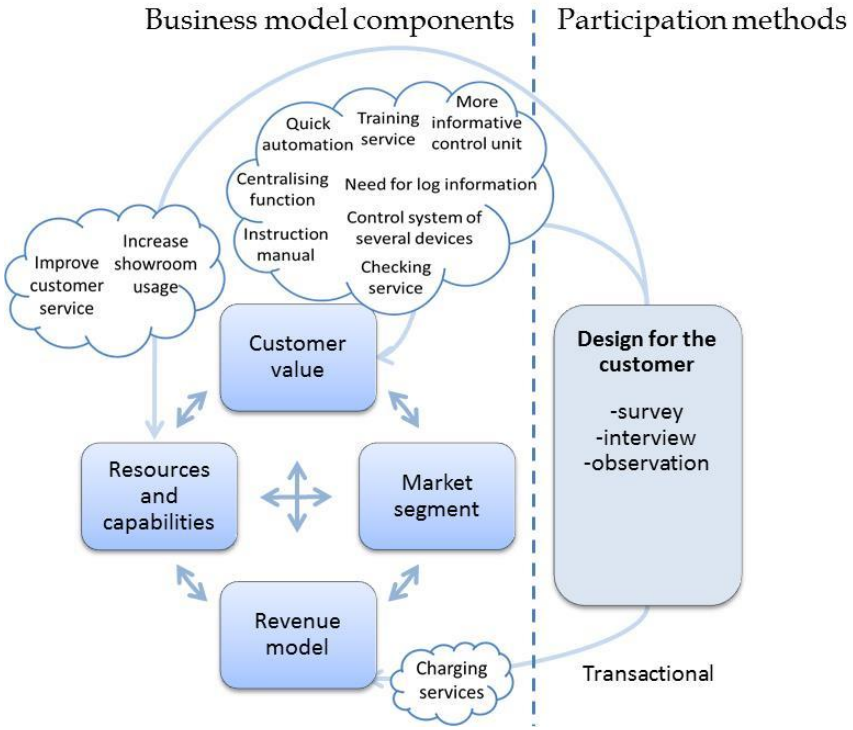

Figure 8. *Improvement ideas of customers on business model*

Improvement ideas concerning resources and capabilities are improving a customer service and increasing usage of the showroom of the supplier. A suggestion towards the revenue model is beginning the charging of the services such as training and trimming the device for the customers.

5.2. Benefits of the utilised participation methods

Benefits of the utilised participation methods in business model innovation are divided into two sections. First, the benefits of interviews and informal discussions are presented and second, the benefits of observing are clarified.

5.2.1. Interviews

During the interviews and casual conversations, each customer company was able to expose their needs. For example, the need for a user manual arose in every company. Furthermore, end users frankly told that they do not need every feature that managers have acquired. Tucker (2001) endorses the idea of exposing the needs of the customers and he claims that customers have the capability to demonstrate their needs and they are also prone to indicate for example when a supplier must alter its offering. Lilien et al. (2002) agrees with Tucker by claiming that customers are able to represent their needs and they can suggest solutions for fulfilling those needs. Thomke & von Hippel (2002) continues by claiming that the customers know their needs much better than the supplier does.

Customers pointed out several improvement ideas as well as a new service and product ideas during the interviews and discussions. Most of the ideas had a practical value for the customers and implementing the ideas would be very valuable for them. Examples of these ideas are a broad introduction service and situation checking service at the location of the customer. The supplier had not recognised these needs before the interviews. The "connect and develop" model of Huston & Sakkab (2006) supports the thought that the ideas from the customers are often valuable. Their model utilises customer involvement and the result of the model is that external sources of innovations and other ideas are often more valuable than the ideas from inside the company. Moreover, the ideas outside the company can complement internal ideas to offer more value for the customers. They claim that the external sources can be formed of networks of the company and thus, the customers are included to these external sources.

The improvement ideas of customer seemed to be innovative. Of course not every idea was innovative but there were several innovative ideas among the incremental ideas. A customer company suggested a quick automation feature and the idea included a totally new function instead of small improvement ideas to the old functions. Some other innovative ideas are a centralising function and a control system for several devices. The study by Matthing et al. (2004) affirms this finding. In his study concerning service development, new service ideas of the customers are found to be more innovative than the ideas of the professional service developers. Furthermore, several other studies have revealed that customer involvements leads to innovativeness (Kristensson et al. 2002). Therefore, involving customers may increase the innovativeness of the company.

Customers were found to be able to bring new aspects for the suppliers personnel. Customers did not limit their ideas into just realisable ideas as the personnel of the supplier often does. Experts have typically a deep understanding of the technology which may become a burden for creativity (Kristensson et al. 2002). Magnussen et al. (2003) suggest another reason for the inability to create innovations. The experts may fear to be ridiculed by other experts if they suggest an unfeasible idea. In the study customers did not face that problem. Customers could see the situation 'out of the box', which created innovative improvement ideas. However, some of the ideas may be impossible for the supplier to realise but most of the ideas seemed feasible. Magnussen et al. (2003) identified that customers who know much about the technology may have the incapability to create innovative ideas.

During the interviews several comparisons with the previous devices or previous procurements were told. Thus, the customers were capable to give historical information about the topic. Creswell (2009, p. 179) claims that ability to provide historical information is one of the reasons to utilise interviews as a method. Silverman (2010, p. 191) adds that interviews are useful when one aims to "get inside the heads" of a selected person or a group of people. He continues that after getting inside the heads one

is able to see the situation from the perspectives of interviewees. This is very useful when trying to understand the customers and their viewpoint.

During the interviews the information can be recorded by writing down the answers or audio-recording. Saunders et al. (2009, p. 341) remark that when the researcher audio-records, one can concentrate on listening to answers and asking questions. After audio-recording, the interviews can be re-listened to and accurate and unbiased answers can be used for analysis. Moreover, audio-recording enables using direct quotes.

5.2.2. Observation

End users of the device were seen as participants of observation because they and their device usage were the ones to be observed. The observation was seen as an applicable method to learn patterns in customer behaviour and to achieve realistic understanding of customers' environments. Saunders et al. (2009, p. 299) state that observation is suitable for explaining "what is going on" in certain situation and Creswell (2009, p. 179) emphasise the usefulness of the observation in situations or topics that are uncomfortable for participants to talk about. Thus, negative aspects of the device and its properties were easier to notice through observation than through interviews. Some malfunctions were detected during the observation and they were reported to the supplier. Furthermore, the researcher understood the dynamics of the device usage.

Creswell (2009, p. 179) remarks that during the observations; the researcher obtains a first-hand experience. Moreover, the researcher can record the data in real time. The real time data is practical because the observer can ask additional information while observing. The researcher did both previous mentioned matters. She recorded real time data and asked additional questions during the observations. Creswell continues that first hand data is more reliable than second or third hand data. Fewer biases are detected when utilising first hand data. This is hard to verify but there is no reason to question this.

Furthermore, observation enables understanding the emotions of the people under observation (Saunders et al. 2009, p. 299). The researcher really could feel the occasional frustration of the end users towards the acquired device. This emerged especially when the device had dysfunction or did not operate as designed for. The researcher thinks that understanding the realistic emotions of end users is impossible to manage immediately. However, it did not take more than a few days to be able to feel as the end users feels. This is important for the supplier company in order to improve their offering and guide the business model into right direction.

The understanding of customers and their needs is important because a deep understanding of the customer's business helps the company to focus on the issues that have great meaning to the customer. Without understanding the drivers of the actual

customer value and their actual needs, the selling company cannot reach maximum proceeds by selling the value to the customer. Thus, customer participation is needed for companies to go beyond the expected customer values and to understand better business goals of their customers. (Terho et al. 2012.) Observing the customers makes sure the supplier understands more than just the expressed customer value.

Furthermore, sometimes customers are incapable of understanding the value that the supplier could produce. Thus, they are unable to ask for this specific value. This problem can also be solved by utilising observation. During the observation at the location of CustomerB, few phases of its processes were revealed to be difficult and even a bit hazardous. CustomerB was not aware of a supplementary apparatus that the supplier could offer for the device.

Moreover, some researchers argues that customers are incapable to describe their real business needs (e.g Terho et al. 2012; Tuli et al. 2007). Customers are also alleged to be unaware of both their current and future business needs (Tuli et al. 2007). From the result section of the thesis we can claim that, customers are capable to describe their apparent needs, at least with little limitations. However, customers seemed to be incapable to demonstrate their latent needs. Thus, latent needs must be revealed in another manner than by asking it directly from the customers. The suitable method for this is observation. Observing the customer revealed issues about customers latent needs such as need for accurate operating with the device. Kristensson et al. (2008) also considers customer participation to be useful for discovering latent needs of the customers. Saunders et al. (2009, p. 299) extrapolate the idea of broad data collection: “virtually all data collected are useful”.

5.3. Challenges in the utilised participation methods

Naturally, there are some challenges in the utilised participation methods. The challenges of the interviews are presented first. After that, challenges of the observations are considered.

5.3.1. Interviews

Several innovative ideas emerged during the interviews as aforementioned. However, most of the ideas were incremental improvements. Moreover, customers were prone to explain the complications they have experienced and discover solutions for the complications. In the study by Lagrosen (2005), representatives of a supplier company claim that a reason for limited customer participation is lack of truly innovative ideas of customers. They argue that customers typically compare the offering of the supplier to the other suppliers. This leads to the emergence of incremental improvements while companies generally want to get access to innovative ideas. Therefore, interview as a

method does not increase the amount of radical innovations remarkably. Moreover, the ideas of customer are less technically sophisticated than the ideas of experienced engineers (Thomke & von Hippel 2002).

The interviews have several bias possibilities. The first one is interviewer bias. The interviewer may interpret the interviewee wrongly which may be for example the misunderstanding of a comment, tone of the voice or non-verbal behaviour. The second type of bias may occur in interpreting the responses. (Saunders et al. 2009, p. 326.) No examples of the conducted research can be given on this topic due to the difficulty to notice the bias. Furthermore, the information acquired through interviews are filtered through the point of view of the interviewee and not every interviewee has a similar ability to express themselves (Creswell 2009, p. 179).

During the interviews, some interviewees seemed slightly uncomfortable. This is one of the challenges of this method. This may have caused some premature ending of the interviews. Saunders et al. (2009, pp. 326–327) considers this issue as well. He considers that the interview is "an intrusive process" and this is especially powerful when the interviewer seeks the understanding of a certain event or an explanation. The interviewee may choose not to reveal everything in order to avoid extra questions and extra embarrassment. Moreover, there may be some topics that interviewees avoid because they are not allowed to discuss them with the researcher. The consequence of this is a partly hidden reality. This hindered the results of the completed interviews. Especially, managers clearly hid some information or at least it was easier to detect the stealth of the managers than the secrecy of employees.

Audio-recording is also a challenge. It is important to record the data from interviews in order to enable conducting deductions of them. Another way to do it is to write down notes but some matters may escape the attention of the researcher and thus, some comments of the interviewee may go unheeded. During the interviews, the audio-recorder affected the relationship of interviewer and interviewee negatively. Some of the interviewees focused on audio-recorder. These people glanced at the recorder and the audio-recorder it made them stumble over their words. According to Saunders et al. (2009, p. 341) the recorder may inhibit responses of the interviewees and thus, reduce the reliability of the results. During the end of one interview, a battery run out which Saunders et al. (2009, p. 341) also claims to be a disadvantage of audio-recording.

5.3.2. Observation

Several challenges in observation as a method for customer participation may occur. An observer must be at the location of event in order to be able to record the observations (Saunders et al. 2009, p. 306). Furthermore, observing is time consuming (Saunders et al. 2009, p. 299). It takes a long time before a supplier or a researcher can really

understand a context of a customer. In this study, the researcher spent several days in two customer companies and only two days in the third case company. Two days were definitely too few but five days in a customer company offered a chance to understand the customers' world. Of course, a longer observation time ensures a better understanding of the situation and therefore, better results can be formed.

The second challenge is an observation bias. It is impossible to detach ourselves from our life experience and knowledge when interpreting a phenomenon. We are unconsciously prone to utilise our background to colour our interpretation of what is believed to be 'true'. Observer bias is impossible to avoid but it is important to realise that the observer bias threats the reliability of the results of observations. Thus, we need to do everything to control the observer bias. (Saunders et al. 2009, p. 297.) During the observations, the researcher realised that she is focusing on the issues that came up earlier and not observing the situation with an open mind. Moreover, the researcher may have missed something important while concentrating on other issues.

In addition to the observer bias, the observer effect threatens the validity and reliability of data collecting. The presence of an observer affects the behaviour of the people under observation. There are two ways to overcome the observer effect. The first one is minimal interactions. The observer tries not to attract attention and to have minimal interaction with the subjects of the observation. The second way to overcome the issue is habituation. The subject of the observing becomes familiar with the observation process. (Saunders et al. 2009, p. 309.) The second method was utilised in this study. During the first days of observation, the end users seemed to somehow fake their actions, but after a couple of days, the end users began to act more relaxed. Thus the observer effect is the third challenge of the observation as a method.

The fourth challenge is access for observation to the customer company (Saunders et al. 2009, p. 299). Nambisan (2002) also mentions a difficulty to find a suitable set of customers for the customer participation. This is, however, a challenge of the interviews as well. Customers may be unwilling to let its supplier into the company and offer the supplier a broad understanding of the processes of the customer. There may be fears of the information ending up with the competitors. However, luckily, in this study there was an easy accesses to the customers due to the close relationship of the supplier and the customers.

Furthermore, the data recording of observations is typically difficult (Saunders et al. 2009, p. 299) and the person conducting the observation may have inadequate capabilities to conduct the observations (Creswell 2009, p. 179). In this study, the researcher used self-memo and an observer diary. Some challenges may occur also in interpreting the recorded data. Afterwards, the researcher found it challenging to construct the notes and try to compose an ensemble.

5.4. Suitability of the exploited framework

This part of the thesis is an answer to the main research question which is "*How can a company utilise customer participation to improve their business model?*" The answer to the question is the proposed and tested framework for customer participation in business model innovation. See Figure 6 on page 22.

The study proved the suitability of the composed framework. First, both the interview and the observation were applicable to customer participation. Customers were able to describe their evident needs and values during the interviews. However, customers were incapable to describe their latent needs and those needs were revealed by observations. Thus, the selected methods can be claimed to be appropriate.

The second indicator of the suitability of the framework is the innovative ideas of customers on the customer value component of a business model. During the survey, customers put both incremental innovations and radical innovation ideas forward. Furthermore, some ideas for other business model components were proposed as well. The business model must be seen as an entity. When changes are made to a single component, adjustments to the other elements are required as well. Thus, when the framework gives new insight into on customer value, change needs occur in the other components as well.

Because one of the customer participation methods was demonstrated to be useful in business mode innovation, the other two methods may be suitable as well. Each three methods are, however, meant for customer participation. In other words, 'design for the customer' was applicable as a method in participative business model innovation. Therefore, design with the customer and design by the customer may be suitable in business model innovation as well. Thus, arrows from each method are drawn in Figure 9. This, however, needs further research to be tested.

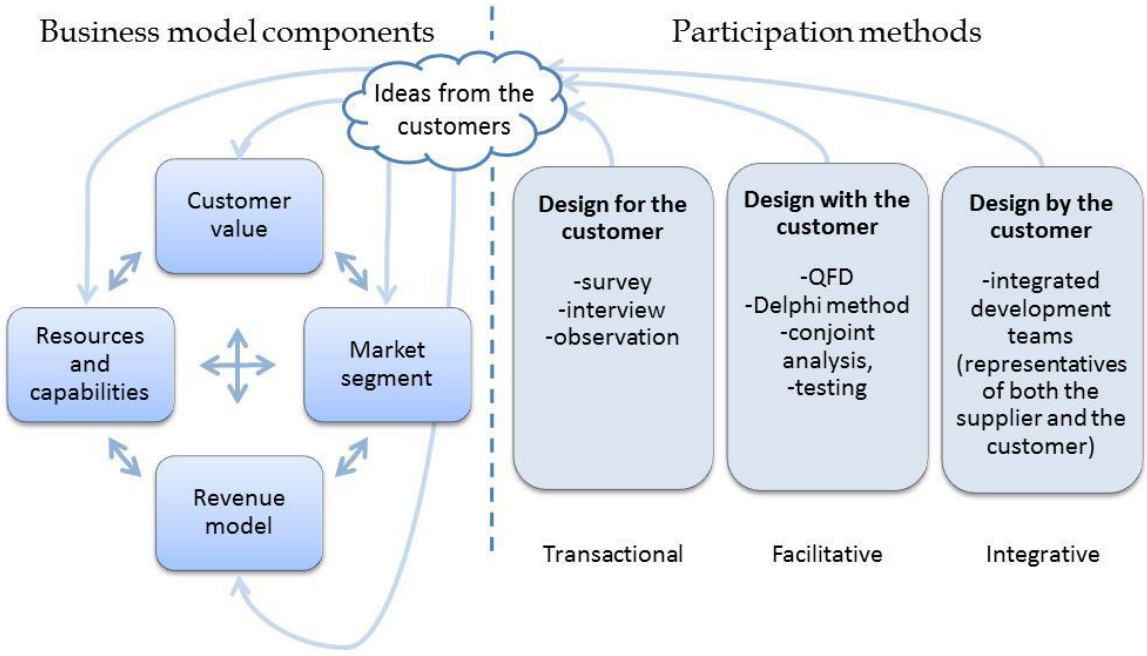

Figure 9. *Framework for customer participation in business model innovation*

The proposed framework is suggested to be suitable in getting customers ideas on other business model components as well. Customers may have the most ideas on customer value, because it concerns them the most and thus, they know it best. Nevertheless, there is no reason why customers cannot suggest innovation ideas on other components. Proposing innovative ideas on for example needed capabilities or suitable market segments may be more difficult but not impossible.

5.5. Benefits of the participative business model innovation

Customer participation offers a chance for the supplier to get a realistic understanding of the customer's needs and wants (Magnussen et al. 2003). When truly understanding the customer value, the company knows when there are some parts of the offering that customers do not value. Thus, valueless services, products and features of products can be discarded from the offering and therefore, they are no redundant cost to the supplier anymore. Examples of this are useless automation features though a broader survey must be conducted before abandoning these features. Furthermore, the attributes of the offering that the customers value and request frequently should be enhanced. To conclude, firms that truly know their customers can offer a smaller but better selection to its customers.

Huston & Sakkab (2006) report remarkable results of the "connect and develop" model which utilises involvement of customers. In their study at Procter & Gamble, external resources such as the customers, partner firms and other participants from the network

of the company were involved in the research and development process. This procedure – called open innovation – led to great business ideas, speeded up the time to market and issued direct cost savings. Similar benefits can be achieved by using customer participation instead of open innovation. Thomke & von Hippel (2002) also mention quicker product development and thus, a faster time to market of new products. They continue that by outsourcing parts of the innovation to the customer, the new offerings suit the customer needs better.

Wind & Rangaswamy (2001, p. 22) also gives an examplary story about the benefits of the customer participation. In their example, teachers were asked to give feedback on the calculator design for use in schools in order to impove its properties. Thousands of teachers gave feedback and after a week of the responses a revised prototype was formed. The design process of the product continued several rounds of feedback. Selling the product was very easy, because the calculator was made in line with customer needs Even better, it was already "pre-sold" during the development process. However, shortly after publishing the product, a competitive company brought an imitation on the market. Even with its cheaper price, only a few customers bought it. The reason for this is, that the customers were furious because 'their' product was stolen by a competitor. There is no reason why this cannot happen in business to busines markets as well.

In the previous example, teachers presumably gave both technical and non-technical improvement suggestions. Ngo & O'Cass (2013) acknowledge in their paper that the company gets new non-technical capabilities and technical capabilities into the company through customer participation. This happened in this thesis as well. The result of the study by Ngo & O'Cass claims that the new capabilities acquired through customer participation raise superiority in service quality which improves a firm performance as Figure 10 demonstrates.

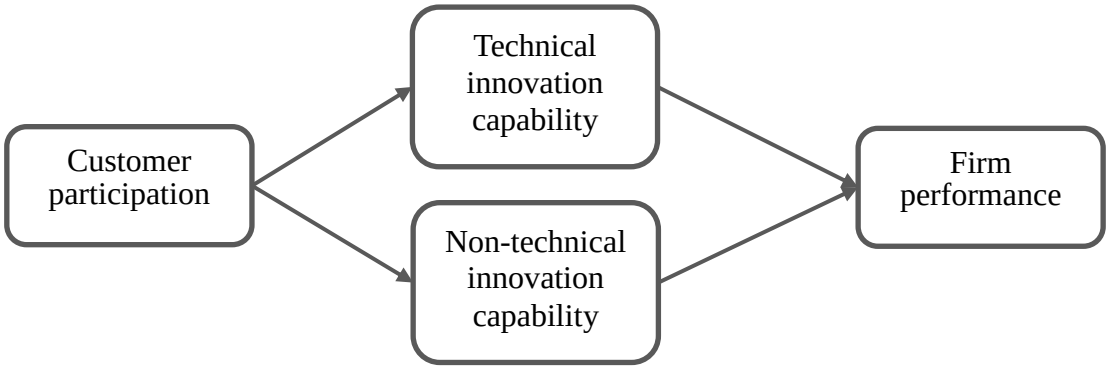

Figure 10. *Effects of the customer participation (adapted from Ngo & O'Class 2013, p. 1135)*

Using customers to generate ideas and innovations has proven to be efficient (Lilien et al. 2002; von Hippel & Katz 2002). Customer participation brings customers and the

company closer together. Therefore, a better base for a long-term relationship is built and typically, long-term relationships are profitable relationships. (Bendapudi & Leone 2003; Payne et al. 2007.)

Customer participation does not only offer advantages for the supplier company but also for the customer company (Normann & Ramirez 1993). Several customers have found the benefits of the participation to be greater than the disadvantages and costs (Prahalad & Ramaswamy 2000; Selden & MacMillan 2006). During the customer participation, both the supplier and the customer are learning from each other (Jaworski & Kohli 2006, p. 112). Furthermore, participating customers are more likely to follow the procedure and to create customised value propositions and offerings themselves (Firat et al. 1995). They may even begin to use their customers in their own business model innovation.

According to Plé et al. (2010), integrating customers into business model renewing has various positive effects on the revenue. Firstly, ideas from customers may enable expanding the markets either within the old markets or penetrate into new markets. Secondly, customers may give ideas to offer a new kind of customer value and develop new value propositions. Furthermore, customers may assist adapting new offering to the markets. Thirdly, indicating the value of customers may generate new networks for the company, which can lead to new customers and new revenue sources.

There are several other studies that have recorded positive effects of customer participation. Bendapudi & Leone (2003, p. 14) states that customer participation is "the next frontier in competitive effectiveness" and Prahalad & Ramaswamy (2000) go further by claiming that utilising customer competences is a competitive strategy. Auh et al. (2007) claim customer participation diminishes costs for a company. Thomke & von Hippel (2002) mention that the customer participation is most worthwhile on markets where a fast product turnaround is vital.

5.6. Challenges in the participative business model innovation

Several reasons for not using customer participation can be listed. Interestingly, according to Lagrosen (2005) the main reason for not using more customer participation is increased costs, both expressed in time and money. Furthermore, a few more confusing reasons are mentioned as well; some companies claim to have too few customers for customer participation whereas some companies believe they have too many customers for customer participation.

Knowing customers and understanding their needs and what they value is not always enough. Sometimes customers are incapable to understand the value that supplier could

produce for them. Thus, the customers cannot even imagine what the supplier could offer and customer participation at design stage is useless. Coates & McDermott (2002) give one type of procedure for these cases. A new technology should be first developed without customer interaction and after that, it should be offered to customers. They also highlight the importance of creating new markets by this procedure.

Plé et al. (2010, pp. 256–257) list five challenges or disadvantages of integrating customers into business model. The first challenge is inappropriate customer participation which can cause failure of the value proposition. To dodge this, the habits, namely how customers are involved and how the company supervises the process, need to be specified before participation. Secondly, cognitive limitations of customers may cause challenges. The company has to ensure that customers are guided properly during the process "by means of organizational socialisation techniques". These techniques should be developed appropriate to the situation and their suitability should be tested beforehand.

The third challenge according to Plé et al. (2010, pp. 256–257) is an immoderate pressure from customers on the supplier. Customers may use the power which they get during the process incorrectly. They may try to keep the benefit to themselves. Fourthly, customers may be confused of the roles they have during the participation. After assimilating new roles e.g. co-designer, co-producer or promoter, the customer may begin to behave competitively towards its supplier. Therefore, the roles that are given to customers must be managed during the participation.

The fifth and the last challenge is having customers understand the benefits of participating, because according to Lagrosen (2005) customers must invest their time and money to the participation. According to Plé et al. (2010) sharing benefits that are generated during the customer participation is important. Customers want to be rewarded for the work they do. Benefits which the customer gets during or after co-operation e.g. better service, a better experience or a reduction of the price, should be indicated clearly to the customer. McElroy (1995) adds an early access to technology to the customer benefits which some customers highly appreciate. Plé et al. (2010) highlight that each challenge that was presented previously can increase costs of the company or decrease revenue of the company if they are not taken into account. Thus, tackling these challenges is essential.

Resistance to the new ways to develop business models is one of challenges in the organisation of a supplier. First, managers must give their blessing to the new business model development process and they must find the balance between new ways and old ones (Gopalani 2010). Second, a resistance in the organisation towards innovations that are not invented within the company may occur (Huston & Sakkab 2006). Employees should understand that innovations which come from outside the company are positive

for the company and that these innovations do not compete with the innovations that come from inside the company.

Furthermore, Ngo & O'Cass (2013) highlight a challenge for managers of the supplier during the customer participation. Managers typically understand the importance of technical innovations and they do not value non-technical innovation as highly as technical innovations. Thus, they may consider customer participation useless due to the little technical innovations originating from customers.

Thomke & von Hippel (2002) remark that by utilising customer participation in innovation, the customers are turned into innovators and thus, innovations are outsourced. They warn the companies not to outsource all innovation activities, if the innovation capabilities are a significant competitive advantage of the company.

In addition, there are more challenges to customer participation but those will be just mentioned shortly. Several studies reveal that customer participation may increase uncertainty about the supplier company (Martin et al. 1999; Ngo & O'Cass 2013; Nambisan 2002). Anderson and Crocca (1993) mention communication barriers between the supplier and the customers. Lilien et al. (2002) notify that the supplier and the customer may have a poor organisational fit. Wind & Rangaswamy (2001) mention that the customers who participated into activities of the supplier may have higher expectations of the suppliers' offering to meet their wants and needs than customers who have not participated. Therefore, customers who had a chance to affect the offering of the supplier are more likely to be dissatisfied and disappointed than customers who did not try to affect the offering of the supplier.

6. CONCLUSIONS

This chapter concludes the result of the study. The thesis achieved academic contribution as well as managerial implications. The second section rounds up concrete improvement ideas of the customers. The objectives of this thesis were mainly reached. Furthermore, the thesis has several limitations and the fourth section asseses those limitations and offers a critical reflection. The last section suggests some ideas for future research.

6.1. Academic contribution

The thesis has given a better understanding of how customer participation can be utilised in business model innovation. There were no similar studies conducted previously as aforementioned. Therefore, customer participation and business model innovation studies were combined and resulted in a framework for participative business model innovation. This topic offers a huge potential for companies to gain a competitive edge.

The presented framework proposes three methods of Lagrosen (2005) for customers to participate into business model innovation. One of these methods is empirically tested. To use the framework, both a method and a specific business model component should be selected for examination. After that, the selected method should be used to gather innovative ideas from customers, concentrating on the selected component. When the selected business model component is altered after customer participation, the changes must be implemented into every component of the business model because all components interact (Kindström 2010).

A part of the framework was empirically tested as a part of this thesis to demonstrate the framework. According to the first experiment, the framework shows potential. Several innovative ideas, both radical and incremental ideas, were gathered from the customers. Hence, the customers can be seen as valuable resources of the supplier as Plé et al. (2010) also proposes. However, some of the ideas of the customers were not practicable but the supplier also got concrete improvement ideas on both the product and new service opportunities. Thus, the framework was successfully applied on the case company, and it may suit other companies as well. However, the framework still needs further testing. Each method must be tested and each component of the business model must be examined. Moreover, the framework must be tested on several industries before it can be concluded that the framework is generally applicable.

6.2. Managerial implications

The case company has developed a new technology. However the income from the automation technology should increase and this cannot be done with technological capabilities only. Thus, it is essential to renew the business model of the case company. Despite the extraordinary technology, the company cannot reach the maximum market potential if the business model lags behind the competitors. If no suitable business model is found, competitors may gain even more profit from copying the technology than the case company who invented the technology.

The case company, which took the role of the supplier in this thesis, got several innovative ideas and recommendations on changes on the business model. A lot of the ideas concern the product but some service ideas emerged as well. Concrete improvement ideas are listed in Table 10. One of the most important suggestions is a user manual which includes information about the error situations and error codes. Another important issue that was commonly highlighted is that each potential buyer should be able to test the automation functions before making the purchase decision. Testing proved the value and the modernity of the device and eased decision making. Moreover, log information of the device usage was seen as useful for the customer and improving the accessibility to this information is highly recommended.

As mentioned, new service ideas also emerged. Customers expressed the need for an introduction or instruction service concerning the device use. It was suggested to organise this service in two phases. The first phase would be arranged at the show hall of the supplier and the second phase at the end location of the device. Furthermore, a checking service of the device is also recommended. The technician of the supplier could conduct a visitation at the site of the customer and solve emerged problems, offer product support and give instructions to new employees. Revenue mechanisms for these services, as well as for product improvements, must be defined before launching these ideas to the customers. By enabling adequate knowledge to use the automation functions and by instantly solving emerged complications, the usage of the features may increase among the customers.

The case company wants to increase usage of the automation function both in order to sell the features more and to enable utilising its remote data system extensively. This thesis proposed services which will most likely increase the usage of the automation technology. Therefore, the results of this thesis offer the chance to achieve efficient usage of the remote data gathering system and thus the possibility to offer services based upon the gathered and analysed data.

The most remarkable finding of this study is the realisation that companies have hidden resources in their customers. Customers invented several innovative ideas to renew the

business model of the supplier. It is therefore recommended that companies use this hidden resource more often.

6.3. Meeting the objectives

The study concentrated on understanding how customer participation can be used when developing and adding services to a business model. Thus, ideas of the customers were surveyed in order to improve the business model of the supplier. The thesis had two purposes as described in the introduction. Firstly, the theoretical aim of the thesis was to increase an understanding of utilising customer participation in business model innovation. Secondly, the aim was to clarify the customer value of the automation features of the supplier company, whose business model needed renewal and to offer ways to increase the usage of the new functions in acquired devices.

Several research questions were set in order to reach the purposes of the thesis. The main research question was:

> *How can a company utilise customer participation to improve its business models?*

The main research question had following sub questions:

> *What kind of value do new features in the offering deliver to the customers and how do they deliver that?*
> *How can a company increase the customer usage of purchased product features?*
> *How can a company add services to the business model with the help of customer participation?*

The answer to the main research question is the proposed framework. This is also the academic value of this thesis. See section 6.1. and Figure 9: Framework for customer participation in business model innovation for further information.

The delivered value of the automation functions was revealed. Chapter 4.4.3. lists these values. However, how the value is delivered to the customer was not fully covered, even though it was a part of the research question. The answer to the second sub question, namely increasing the usage of the features, is by offering new services. These service ideas are presented shortly in the previous section, 6.2 Managerial implications.

The need for the services came from the customers who also offered the service ideas. In other words, the new services were ideas of the participated customers. Therefore, customer participation may suggest adding services into the offering. Customers want to solve their problems by asking useful services for them. This functions as an answer to

the last sub question. To conclude, the thesis reached its aims and answered the research questions comprehensively with the exception of a part of the first sub-question.

6.4. Limitations and critical review

The thesis provides a method for customer participation in business model innovation. The method was implemented in three customer companies and the results seem to be both reasonable and useful. However, there are several limitations related to the method and results. The limitations can be divided into two groups, which are reliability and validity. Validity consists of content validity, criterion-related validity and construct validity (Carmines & Woods 2005).

The reliability of the research can decrease due to several reasons. Reliability refers to the accuracy of the results gained in the study and questions whether the same results would have been obtained by someone else (Gummesson 2000, p. 185). The study consisted of two research method and thus, the reliability of both interviews and observation must be considered. These subjects have been looked through in the sections of 5.2.1 and 5.2.2. Thus, the same discussion of the reliability is not repeated in its entirety. Two main limitations were found in those sections. The first one is subject error and bias and the second one is participant error and bias.

As mentioned earlier, validity consists of content validity, criterion-related validity and construct validity. Content validity estimates how selected empirical measure represent the content that it is meant to measure (Carmines & Woods 2005, p. 934). The relatively low number of observation days in third case company and a low number of manager interviews decrease the content validity of the research. If the research had continued longer, other opinions among other managers might have occurred and extra observation days might have revealed new data. Furthermore, the interviews were not evenly spread between the participating companies due to a different amount of device users per each case company. Thus, some aspects may have been overly emphasised.

The second validity under the survey is a criterion-related validity. It denotes the correlation between a measure and the selected criterion (Carmines & Woods 2005, p. 935). Criterion validity can be tested by comparing the results to direct results of other measurements of the same phenomenon (McDonald 2005, p. 945). The results of the method used were compared to the literature and discussed with both the supplier company and the customer case companies. The expert opinions of the supplier confirmed the results to be correct though the results would have been more reliable if there was more empirical research in different customer companies.

Thirdly, construct validity concentrates on formulating theoretical expectations of the chosen theoretical concepts (Carmines & Woods 2005, p. 936). In this study, the

theoretical prediction, which is the applicability the formed framework for the customer participation in business model innovation, is consistent with the empirically reached results. Hence, the study can be claimed to be construct valid.

Furthermore, the applicability of the constructed framework for participative business model innovation must be considered as one of the limitations. Only one method of the three methods for customer participation was piloted with three customer companies. Each customer company had innovative business model ideas and thus, it can be proposed that the method seems suitable for this purpose. However, other proposed methods were not tested and they may be inapplicable for customer participation in business model innovation. Hence, the applicability of the entire framework is not proved yet. Moreover, the implemented method was used only to improve one component of a business model. Other components should be taken into account as well. To conclude, each method must be tested with customers to innovate every component of the business model. The applicability of the entire framework can be proven by testing it in its entity and in real surroundings.

In addition to limitations, a critical review of the thesis is needed. Three critical aspects are discussed. The literature was only partly covered when beginning the interviews. Therefore, the questioning frame may have some deficiencies. In practice, some issues may not be fully discussed during the interviews. A counteraction for this was the structure of the interviews. Semi-structured interviews were used and thus, interviewees were able to emphasise important issues and their opinions. The second aspect is the language and terms used in the interviews. Some interviewees found difficult to understand some words in the questions or asked to rephrase the question. Using words for different purposes may affect the results. The third aspect is translations. The translation of the quotations might be inaccurate at times. This may cause some misinterpretation of the results.

6.5. Future research

Both the customer participation and business model innovations are wide research areas. As noted earlier, there are no studies which combine those areas into a framework. Since this is the first research on the broad topic and the scope of this thesis was limited, not every aspect of combing those areas are included into the proposed framework. Therefore, further studies are need due to extent of the topic.

As mentioned in the part about limitations of this study, only one of the proposed methods of customer participation in business model innovation was tested. Testing the other methods of customer involvement is needed. Moreover, the study concentrated only on one business model component which was customer value. Thus, every other business model component still needs testing. Hence, future research should cover all

the combinations of the methods and business model components in order to prove suitability on functionality of the proposed framework.

Benefits and challenges of customer participation in business model innovation also need further research. Previous studies present benefits, disadvantages and challenges of several types of customer participation. However, due to the lack of the studies exploring participative business model innovation, there are no studies on the benefits and challenges of customer participation in business model innovation either. Hence, studying the benefits and challenges of utilisation of customer participation in business model development is encouraged. Moreover, ways to overcome these challenges need to be surveyed.

Furthermore, diverse other smaller ideas emerged. For example, how to commit a customer to business model innovation of the supplier needs further research. Another future research idea is to include customers of the customers into the innovation. Third parties may have differing ideas than second parties. By concentrating on third parties, there might emerge ideas to bring even greater customer value for the customers.

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APPENDICES (2 PIECES)

To maintain the anonymity, the precise names of the device and the company have been altered.

APPENDIX 1: Questioning frame for employees

1. **Haastateltavan taustatiedot**
    a. Mikä on toimenkuvasi ja keskeiset tehtäväsi?
    b. Kuinka pitkään ja missä tehtävissä olet työskennellyt yrityksessä?
    c. Millaisia tutkimuksen kohdelaitteeseen verrattavissa olevia laitteita olet käyttänyt aiemmissa tehtävissäsi? Kuinka paljon?
    d. Kuinka kauan olet käyttänyt juuri tätä laitetta?

2. **Työnkuva**
    a. Mitkä asiat vaikuttavat työn sujuvuuteen?
    b. Kuinka suuri rooli kyseisen laitteen toiminnalla on? (1-5)
    c. Mitkä asiat laitteen toiminnassa ovat tärkeitä työtehtäväsi kannalta?
    d. Mitkä asiat ovat kriittisiä tai haastavia työssä?
    e. Miten työtehtävääsi voisi helpottaa yleisesti? Entä tämän laitteen avulla?

3. **Prosessit yleisesti**
    a. Kuinka monta kertaa vuoron aikana käytät laitetta?
    b. Ketkä muut käyttävät samaa tätä kanssasi?
    c. Onko laite yleensä vapaa vai sen vapautumista odottaa? Kuinka pitkiä ovat jonotusajat?
    d. Käytetäänkö kahta samantyyppistä laitetta samaan aikaan? Minkälaisissa tilanteissa?
    e. Millaisia riskejä laitteen käyttö aiheuttaa?

4. **Uusi teknologia**
    a. Mitä mieltä olet uudesta teknologiasta?
        a. käytettävyys
        b. tekninen suorituskyky
        c. kyvykkyys edistää tuotantoa
        d. turvallisuus
        e. hankintahinta
    b. Mistä asioista pidät uudessa teknologiassa? Mikä toimii hyvin?

c. Mistä asioista pidät uudessa teknologiassa? Mikä ei toimi? Onko teknologiassa tai sen ominaisuudet aiheuttaneet tyytymättömyyttä?
d. Onko laite toiminut moitteettomasti käyttöönoton jälkeen? Miksei ole?
e. Miten muuttaisit laitetta?
f. Mitä mieltä olet ohjausyksiköstä? Onko sitä vaikea/helppo käyttää? Miksi?
g. Vertaa uutta ohjausyksikköä vanhaan? Mitä hyvää? Mitä huonoa? Mitä parannettavaa?

5. **Teknologian toiminnot**
   a. Mitä ominaisuuksia uudessa laitteessa on verrattuna vanhoihin?
   b. Käytätkö näitä ominaisuuksia? Kuinka usein? Miksi käytät? Mitä mieltä olet näistä ominaisuuksista?
   c. Käyttävätkö muut käyttäjät laitteen uusia toimintoja? Miksi he käyttävät?
   d. Oletteko saaneet koulutuksen laitteen käytöstä/toiminnoista?
   e. Olisiko koulutus hyödyllinen? Onko kiinnostusta koulutusta kohtaan?
   f. Puuttuuko laitteesta joku ominaisuus, joka helpottaisi työtäsi?
   g. Olisivatko toiminnot hyödyllisiä myös vahoissa laitteissa? Millaista hyötyä? Miksei olisi?

5.1. Käytetään
a. Miltä käyttö tuntuu?
b. Oliko helppo oppia käyttämään?
c. Suosittelisitko muille?
d. Mitä hyötyä niiden käytöstä on? Aika, vaiva, turvallisuus?
e. Millaisia ongelmia käytettäessä?
f. Millaisia parannusehdotuksia sinulla olisi?

5.1 Ei käytetä
a. Miksi et käytä?
b. Oletko kokeillut? Miksi et ole?
c. Kiinnostaisiko kokeilla? Miksi ei?
d. Onko kukaan näyttänyt miten toimii?
e. Onko kukaan kertonut mitä hyötyjä toiminnoista on?

6. Hankintaan liittyvät kysymykset
   a. Miksi laite hankittiin? (uusi tehdas / teknologia vanhentunutta / suorituskyky)
   b. Miksi juuri tämä laite ostettiin? Oliko ostopäätös mielestäsi oikea?
   c. Ketkä olivat mukana tekemässä ostopäätöstä?
   d. Kuvaile ostoprosessia?
   e. Mitä luulet, millä perusteella kyseinen laite valittiin?
   f. Mitä asioita sinun mielestäni olisi pitänyt huomioida laitetta ostettaessa?
   g. Kysyttiinkö sinulta, millainen laite tulisi hankkia ja millaisia ominaisuuksia siinä tulisi olla? Miksi kysyttiin? Miksi ei kysytty?
   h. Olisitko halunnut, että sinulta olisi kysytty?
   i. Olisitko halunnut kokeilla laitetta ennen ostopäätöksen tekemistä?
   j. Millaista oli toimittajayrityksen henkilöstön toiminta ostoprosessin aikana? Entä toimituksen aikana? Entä toimituksen jälkeen? (positiivista ja negatiivista)
   k. Miten kehittäisit heidän toimintaansa?

7. Muuta
   a. Tuleeko mieleesi jotain muuta haastattelun aiheeseen liittyvää tai lisättävää?
   b. Onko sinulla jotain kysyttävää tai kommentoitavaa?

APPENDIX 2: Questioning frame for managers

1. **Haastateltavan taustatiedot**
    e. Mikä on toimenkuvasi ja keskeiset tehtäväsi?
    f. Kuinka pitkään ja missä tehtävissä olet työskennellyt yrityksessä?

2. **Toimiala**
    a. Mitä yritys tekee? Mikä on yrityksen ydinosaamisalue?
    b. Miten menestytte toimialallanne kilpailussa?
    c. Millä tekijöillä mitataan toimialanne yritysten välisiä suorituseroja?
    d. Mitkä ovat keskeiset haasteet yrityksenne toimialalla?
    e. Minkä ongelmien ratkaisulla saavutettaisiin erinomainen kilpailukyky toimialalla?

3. **Ostoprosessi**
    a. Kuvaile laitteen ostoprosessia?
        a. Miten ostoprosessi eteni?
        b. Kuka otti teihin yhteyttä? Keneen te otitte yhteyttä?
        c. Kuinka monta henkilöä myyvän yrityksen puolelta oli mukana myyntiprosessissa? Missä rooleissa?
        d. Millaisia ongelmia kohtasitte ostoprosessin aikana? Mikä toimi hyvin?
        e. Miten myyvä yritys voisi helpottaa ostoprosessianne?
        f. Missä vaiheessa tuotantolinjan suunnittelua kyseisen laitteen valinta tehtiin?
        g. Kuinka hyvin myyjät ymmärsivät liiketoimintaanne ja tarpeitanne?
    b. Ketkä olivat tekemässä ostopäätöstä? Ovatko he olleet aiemmin ostamassa konetta?
    c. Kysyttiinkö laitteenkäyttäjien mielipidettä? (Miksei?)

4. **Laitteen valinta**
    a. Mitkä asiat olivat teille tärkeitä/vähemmän tärkeitä ostettaessa laitetta?
        a. Hyödyt/arvo
        b. Uhraukset/kustannukset
    b. Millaiset kriteerit oli asetettu hankittavalle laitteelle? Miksi juuri nämä?
    c. Mitkä tekijät vaikuttivat valintaan ja miten?
    d. Miksi juuri tämä laite ostettiin? Oliko ostopäätös mielestäsi oikea? Millä perusteella?
    e. Mitä palveluita ostettiin laitteen lisäksi? Miksi nämä? Mitä muita palveluita tarjottiin?
    f. Mitä muita laitteita pidettiin varteenotettavina vaihtoehtoina?
    g. Mitä hyvää niissä oli? Mitä huonoa? Miksei niitä valittu?
    h. Oletko päässyt kokeilemaan laitteen käyttöä? Millaisten? Missä?
    i. Miten tärkeäksi koet kokeilun ostopäätöstä tehdessä?

5. **Teknologian toiminnot**
    f. Mitä ominaisuuksia laitteeseen hankittiin? Millä perusteella nämä valittiin?

g. Mitä mieltä olet uudesta laitteesta? Millaista arvoa uusi teknologia tai sen toiminnot saavat aikaan?
    f. käytettävyys/työn helpottaminen/ergonomia
    g. tekninen suorituskyky
    h. kyvykkyys edistää tuotantoa/parantunut tuottavuus/työvaiheiden nopeuttaminen
    i. turvallisuus (ihmisten, infrastruktuurin)
    j. hankintahinta
    k. elinkaari
    l. kunnossapito/alentuneet huoltokustannukset
h. Mitä muita ominaisuuksia oli vaihtoehtoina? Miksei näitä hankittu?
i. Käytetäänkö hankittuja toimintoja? Kuinka usein? Miksi käytetään? Miksei käytetä? Ketkä käyttävät? Ketkä eivät käytä?
j. Millaisen koulutuksen laitteen käyttäjät saivat?
k. Onko tarvetta (lisä)koulutukselle? Kenen se tulisi järjestää?
l. Miten kehittäisit laitetta ja sen ominaisuuksia? Miten prosessista saataisiin sujuvampi/turvallisempi tai työtehtävistä helpompia?
m. Oletteko suunnitellut vanhojen koneiden modernisointia? Millaiset toiminnot olisivat hyödyllisiä vanhoissa laitteissa? Miksi?

6. Asiakasarvon kommunikointi ja argumentointi, asiakasarvoehdotelma

a) Miten myynnissä painottuivat tuote- ja palvelumyynti?
b) Miten myyjät painottivat 1) asiakastarvetta, 2) Omaa osaamistaan ja resursseja, 3) vertailua/differointia kilpailijaan ja 4) arvoketjua?
c) Kuinka konkreettisesti tuotiin esille 1) hyödyt, 2) uhraukset, 3) optimaalinen käyttötilanne ja 4) ajanjakson, jonka aikana asiakasarvoehdotelma tulee täytetyksi?
d) Millaisia argumentteja myyjä käytti ”väitteiden” tukena (laskelmat referenssiluvut, keskiarvoluvut, esimerkkiluvut, referenssicaset, asiakkaan mittarit…)?
e) Olivatko myyjän esittämät argumentit vakuuttavia? Miksi oli? Miksei ollut? Miten ne olisi saatu vakuuttavammiksi?
f) Millä muilla argumenteillä laitetta ja sen ominaisuuksia voisi myydä?
g) Pitäisikö yrityksen mukauttaa arvoehdotelmaa asiakkaittain tai ostorooleittain?

7. Myyvän yrityksen henkilöstön toiminta

a. Millaista oli myyvän yrityksen henkilöstön toiminta ostoprosessin aikana? Entä asennuksen aikana? Entä asennuksen jälkeen? (positiivista ja negatiivista)
b. Miten heidän toimintaa voisi kehittää? (ennen ja jälkeen toimituksen)
c. Onko laite toiminut moitteettomasti käyttöönoton jälkeen? Miksi ei ole?

8. Tulevaisuus

a. Mitkä ovat yrityksen tavoitteet? Millaisia haasteita on tavoitteiden saavuttamisessa?
b. Miten yrityksen toimintaa tulisi kehittää tulevaisuutta silmällä pitäen?
c. Mitä viimeaikaisia muutoksia liiketoimintaympäristössä on tapahtunut?
d. Miten liiketoimintaympäristönne tulee jatkossa muuttumaan?
e. Mitkä tekijät vaikuttavat toimialanne kehitykseen?
f. Mitä uhkatekijöitä ja mitä mahdollisuuksia muutokseen liittyy?

10. Muuta

c. Tuleeko mieleesi jotain muuta haastattelun aiheeseen liittyvää tai lisättävää?